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ABSTRACT

This annotated bibliography on the reading achievement of the deaf is designed to aid those who wish to learn more about how children with severe auditory handicaps read. The various sections focus on the severity of the reading deficit of deaf students, the findings of basic research on how they read, and some of the instructional approaches currently advocated for these students. Part One contains 16 entries relating to background issues such as whether hearing problems automatically lead to cognitive problems and what other communication options exist for those who are hearing impaired. Part Two cites 49 entries that examine the extent of the reading problems of hearing imparied students and some of the psychometric and educational factors underlying these problems. Part Three examines basic research on reading and language skills and lists 64 pertinent articles. Part Four summarizes the current literature on instructional approaches to developing the reading skills of deaf students and contains references to 72 items. (MKM)

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AUDITORY HANDICAPS AND READING

An Annotated Bibliography

Compiled by Leo D. Geoffrion
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INTRODUCTION

The Education for All Handicapped Children Act (Public Law 94-142) mandates that all handicapped children receive an appropriate education in the least restrictive environment. This law challenges educators to reexamine the effectiveness of various special education approaches and determine whether all handicapped children need to be segregated into separate programs and facilities. Whether one works in a special education program or the regular classroom, educators need to learn more about how to teach reading and other basic skills to these children.

This bibliography is designed to aid those who wish to learn more about how children with severe auditory handicaps read. The various sections herein will focus on the severity of the reading deficit of deaf students, the findings of basic research on how they read, and some of the instructional approaches currently advocated for these students.

The Deaf Child

The children born with severe auditory handicaps live in a world with few sounds. The children may hear clearly only the loudest sounds, if any. Hearing aids cannot solve their problems because there are physical limits to amplification beyond which the hearing aid itself leads to further hearing loss.

On first impression, the loss of hearing may not seem to be a serious handicap. Many people experience hearing losses in later years without serious disruption in their lives. The effect of a hearing loss in childhood is far more serious since, without exposure to spoken language, few persons develop a good understanding of the English language. This in turn leads to serious educational, experiential, and social deficits because the deaf child is unable to converse easily with others.

For the deaf child, the key problem is the inadequate English language skills which result from the child's lack of sounds. In analyzing this language deficit, however, one must distinguish among four similar aspects.

Speech Speech is the most commonly used aspect of language and communication skills. Indeed, speech is so central for most hearing

individuals that many theorists and educators mistakenly assume that speech is the basis for all communication.

Linguistic Systems Another important aspect is the many linguistic systems in use around the world. In the broadest sense, languages are a series of rules individuals share and which permit the expression of ideas more elaborate than one-word messages. Most languages are sound-based, although languages can be based on other systems. Chinese writing, arithmetic notation, and sign languages are all examples of linguistic systems based on things other than spoken sounds.

Nonlinguistic Communication People also share information through systems outside of the linguistic structures. Examples of these include the use of gestures, pointing, facial expression, body language, and vocal inflection. All of these can be used to share information with others even though they cannot be represented within most language systems.

Internal Representation Finally all people possess some form of internal language or code which permits the representation and analysis of ideas and concepts within one's mind. Hearing individuals are so used to using words in their introspection that they often assume the spoken word is the only internal representation system. Experimental psychologists can create situations where one can think about and remember events which one is unable to describe verbally. It is a tribute to the power of verbal language that such instances are rare.

Which of these four aspects are impaired by the deaf child's lack of exposure to sounds? On first glance, one might assume that all are impaired. Indeed, the old term for the nonvocal deaf child as "deaf and dumb" aptly summarizes this position. Dumb can mean both the lack of speech and the lack of ideas. To many the two are equivalent.

Research on the cognitive skills of the deaf shows that when language-free testing procedures are used, the deaf student is not impaired in the ability to reason logically or to solve various problems. Thus one must assume that the deaf possess some form of internal representation scheme which is adequate in spite of their inability to hear sounds consistently. Nonlinguistic communication has not been extensively researched with deaf individuals, but experience indicates that most deaf students are very aware of this communication and use it effectively.

Linguistic development is probably the biggest problem area with the deaf. The evidence is readily available that the English language skills of the deaf, when compared to other people, are very deficient. Does this mean that the deaf child is deficient in the skills needed to learn all languages? Underlying this question is the long and bitter debate over the nature of sign languages and their role in the communication growth of deaf children. Traditionally, many have viewed sign languages as a primitive form of pidgin English done in gestures. It is commonly assumed that sign languages are inadequate when compared to English, and sign languages

are often described in terms of the English structures they lack. More recently, many linguists have argued that the sign languages are natural languages with all the complexities and powers inherent within any language. If these linguists are correct, then the fact that most deaf children who are exposed to signing in early childhood easily learn it points to the conclusion that the ability to acquire language is not impaired in the deaf child.

Reading and Deafness

If deaf children are not intrinsically impaired in the ability to learn language and communication systems which are not based on sound, are reading and writing effective communication systems for them? Through print one could communicate easily with others.

Unfortunately, few deaf students become skilled readers. The average reading level of deaf adults is at about fourth grade, or barely sufficient to read the newspaper. Why does the deaf child experience such difficulties learning to read, and what can be done to make reading instruction for the deaf more successful?

First of all, one must recognize that, while print involves a visual medium, it is still basically an auditory process. Alphabets were developed to represent visually the sound of the language and not the concepts or other units within the language.

Second, nearly all our approaches to reading instruction assume the central role of sounds, both by assuming the child is thoroughly familiar with the sounds of the language and by basing initial instruction on relating printed words to those sounds. If the deaf child has poor familiarity with sounds, can there be other modes through which one can develop reading? Might the discovery of these other modes help children with other learning problems also?

Finally, can one develop good reading skills in the absence of strong English language skills? Traditionally, reading instruction has followed language development in that one assumes the child will be unable to read linguistic structures which they cannot understand by other modes. Much of the current interest in the language experience approach is based on the desire to match the reading material to the child's language and interests. As reading specialists begin teaching deaf children, they will have to learn more of how to weave language instruction into reading activities.

Auditory handicaps, and the language deficits which accompany them, present a particular challenge to educators. The authors hope that this annotated bibliography will spark interest in reading instruction for the deaf.

Part 1 BACKGROUND ISSUES

Two background issues are of particular importance for educators who may be unfamiliar with the education of deaf individuals. These are the issues of whether the hearing problems automatically lead to cognitive problems, and if hearing is impaired, what other communication options exist.

Cognitive Development

The first issue is an understanding of the effects of a severe hearing loss on cognitive, linguistic, and social development. The most obvious effect is that more deaf students experience great difficulty learning the English language. Since most learning, whether within school or outside of it, is based on communication with others, the deaf child faces a double deficit. In addition to having very imperfect skills in receiving information from others, the deaf child is also handicapped by inadequate expressive skills to ask questions of other people.

Do these communication difficulties automatically lead to cognitive deficits? This question is very important for many reasons. On the practical side, it affects how educators perceive the potential within the deaf child. On the theoretical side, it helps to clarify the relationship between thought and language. The following studies review this issue of the cognitive development of children with poor English language skills.

1.01 **Bornstein, H., and H.L. Roy.** "Comment on 'Linguistic Deficiency and Thinking: Research with Deaf Subjects 1964-69,'" *Psychological Bulletin*, 79 (1973), 211-214.

1.02 **Furth, H.** "Linguistic Deficiency and Thinking: Research with Deaf Subjects 1964-69," *Psychological Bulletin*, 76 (1971), 58-72.

1.03 **Furth, H.** "Further Thoughts on Thinking and Language," *Psychological Bulletin*, 79 (1973), 215-216.

Furth's original paper reviews 39 studies of the cognitive skills of deaf students. When the task is independent of language, both

directly (not a verbal question) and indirectly (not dependent on information usually acquired from past verbal experiences), deaf students perform as well as hearing students. Furth concludes that cognitive skills are independent of language and that the deaf student suffers primarily from language deficiency rather than cognitive deficits. Bornstein and Roy attack this conclusion as inadequately proven from the available data. The second Furth paper attempts to rebut this critique.

1.04 **Furth, H.G.** *Thinking without Language: Psychological Implications of Deafness.* New York: Free Press, 1966.

Deaf individuals are unique in that most grow up without adequately learning the language around them. This book explores the research on the cognitive skills of the deaf, with emphasis on resolving the role of language in thought. When tested nonverbally, deaf individuals score as well as hearing people in most cognitive tasks.

1.05 **Mindel, E.D., and M. Vernon.** *They Grow in Silence: The Deaf Child and His Family.* Silver Spring, Maryland: National Association of the Deaf, 1971.

Provides an introduction to the psychology of deafness with particular emphasis on the deaf child and his or her family. This book considers many of the biases that hearing people have toward the deaf, as well as the impact of the deaf child on the family. Considerable space is also given to contrasting oralist and total communication approaches to instruction.

1.06 **Myklebust, H.R.** *The Psychology of Deafness: Sensory Deprivation, Learning, and Adjustment.* New York: Grune and Stratton, 1964.

Designed as a comprehensive textbook on deafness, this book discusses the nature of deafness; its relation to cognitive, social, and motor development; and the academic effects of such deficits. Considerable discussion is given to the writing skills of the deaf as analyzed by the Picture Story Language Test.

1.07 **Vernon, M.** "Relationship of Language to the Thinking Process," *Archives General Psychiatry,* 16 (1967), 325-333.

Reviews 33 different studies of the cognitive abilities of hearing handicapped students. The author found no functional relationship between verbal language skills and cognitive skills. Verbal language is not the only mediating symbol system available for thought processes.

1.08 **Vernon, M.** "Fifty Years' Research," *Journal of Rehabilitation of the Deaf,* 1 (1968), 1-12.

Reviews approximately 50 studies conducted since 1930 on the IQ

of deaf students. When nonlanguage dependent tests are used, the IQ scores obtained for the deaf are comparable to those of hearing students. While hearing deficits lead to English language deficits, they do not necessarily lead to cognitive deficits as well.

Communication Alternatives

For hearing individuals, the practice of communicating through speech is so highly developed that one rarely considers the need for other communication systems. For the deaf, however, speech-based communication is a difficult skill which is mastered only after many years of intense practice. The difference is clearest when one notes that hearing children enter first grade with better oral skills than many deaf students possess when they leave elementary school.

This English language deficit has led many educators to develop communication systems which augment the deaf child's imperfect hearing ability. In the oral/aural method children learn the sounds of English through speechreading* and speech production. Another broad group of approaches uses a manual representation of the language as well. Some of these manual approaches include the following:

Sign System	*Sign Representation*
Cued Speech	The individual sounds.
Fingerspelling Rochester Method	The individual letters in words.
Manual English Signed English Signed Exact English Seeing Essential English Learning Visual English	Each sign represents a word or morpheme, but English grammar is used throughout.
American Sign Language (also called ASL, Ameslan)	Each sign represents a morpheme but with no attempt to match English words or grammar.

Most of the earlier educational programs viewed these communication alternatives as dichotomous. Educators believed one should learn only one of the systems and attempting to teach more than one would only lead to confusion within the deaf child. The dichotomy has been clearest in the debates between the oralists and manualists.

More recently, the Total Communication approach has emerged. Total Communication (TC) sees the various systems as mutually supportive and encourages the use of all relevant modalities and systems when developing communication skills.

*Speechreading is the more correct term than lipreading since the person attends to more than just the lips.

The following papers describe some of these systems and critique their strengths and weaknesses.

1.09 **Bornstein, H.** "A Description of Some Current Sign Systems Designed to Represent English," *Journal of Speech and Hearing Disorders*, 39 (1974), 330-343.

Presents the basic logic of a manual parallel to spoken English, called Signed English, and describes the materials designed to facilitate skill with this system.

1.10 **Bornstein, H.** "Signed English: A Manual Approach to English Language Development," *Journal of Speech and Hearing Disorders*, 39 (1974), 330-343.

Presents the basic logic of a manual parallel to spoken English, and describes the materials designed to facilitate skill with this system.

1.11 **Cornett, R.O.** "The Learning of English by the Deaf," *Teaching English to the Deaf*, 2 (1974).

Discusses some of the limitations inherent in learning a spoken language, such as English, through signing. Presents cued speech as an alternative system which combines signing with speech. Cued speech uses simple hand signs to distinguish among sounds with similar lip configuration.

1.12 **Cornett, R.O.** "Cued Speech and Oralism: An Analysis," *Audiology and Hearing Education*, 1 (1975), 26-33.

Reviews the rationale for augmenting conventional speechreading with cued speech. Demonstrates the effectiveness of cued speech in a variety of experiments and presents a case study of a child developing language through cued speech.

1.13 **Deland, F., and H.A. Montague.** *The Story of Lip Reading: Its Genesis and Development.* Washington: Alexander Graham Bell Association for the Deaf, 1968. Eric Document Reproduction Service No. ED 036 911.

Describes the historical development of speechreading from 1500 to 1931. Uses quotations from famous educators of the deaf to highlight the importance of oral approaches to teaching the deaf.

1.14 **McClure, W. J.** "The Rochester Method and the Florida School," *American Annals of the Deaf*, 120 (1975), 331-340.

Reviews the rationale for using manual communication in addition to oral methods. The simultaneous use of fingerspelling and speech (Rochester method) was adopted by this school. Data from the Stanford Achievement Test showed that the Rochester method produced superior reading and language skills.

1.15 **Moores, D.F.** "Nonvocal Systems of Verbal Behavior," in R.L. Schiefelbusch and L.L. Lloyd (Eds.), *Language Perspectives-Acquisition, Retardation, and Intervention*. Baltimore: University Park Press, 1974.

Reviews the major characteristics of American Sign Language, various forms of manual English, and fingerspelling. Examines the linguistic and instructional aspects of sign languages, along with studies of the effectiveness of these approaches with hearing impaired and other communication handicapped students.

1.16 **Wilbur, R.B.** "The Linguistics of Manual Languages and Manual Systems," in L.L. Lloyd (Ed.), *Communication Assessment and Intervention Strategies*. Baltimore: University Park Press, 1976.

Presents a comprehensive review of the linguistics of the various manual communication systems used with deaf students. Considers the effects of these systems on the child's memory and reading processes.

Part 2 THE READING ACHIEVEMENT OF DEAF STUDENTS

The papers in Part 2 examine the extent of the reading problems of hearing impaired students and some of the psychometric and educational factors underlying these problems.

The largest group of studies within this section come from the Office of Demographic Studies at Gallaudet College. In addition to publishing a special hearing impaired edition of the Stanford Achievement Tests, this office regularly conducts nationwide surveys of the academic skills of deaf students and information about their academic programs.

The Reading Skills of Deaf Students

This first group of studies presents the results of surveys of the reading achievement of hearing impaired students. In reading these studies, notice how the reading achievement of deaf students is uniformly poor across grades. By the time deaf students leave school, they read as much as seven years behind hearing students of the same age. Similarly, longitudinal studies reveal only a slow reading growth from year to year.

2.01 **Babbini, B.E., and S.P. Quigley.** *A Study of the Growth Patterns in Language, Communication, and Educational Achievement in six Residential Schools for Deaf Students.* Urbana: University of Illinois, 1970. Eric Document Reproduction Service No. ED 046 208.

163 students from six schools were tested annually from 1963 to 1967 in speechreading, fingerspelling, speech, reading, and mathematics. Girls regularly outperformed boys in reading and the other language measures. The reading growth per year averaged only 0.3 grade levels. At the end of the study, the deaf students scored 6 years below the expected achievement for hearing students.

2.02 **Balow, B., H. Fulton, and E. Peploe.** "Reading Comprehension Skills among Hearing Impaired Adolescents," *Volta Review*, 73 (1971), 113-119.

157 hearing impaired adolescents were tested with the New Developmental Reading Test and the Metropolitan Reading Test. Data analysis revealed that the students appeared to have more difficulty with creative than with literal comprehension. Allowing the deaf students unlimited time to complete the tests failed to produce a noticeable improvement in test scores.

2.03 **Balow, I.H., and R.G. Brill.** "An Evaluation of Reading and Academic Achievement Levels of 16 Graduating Classes of the California School for the Deaf, Riverside," *Volta Review*, 77 (1975), 255-266.

Examines the test scores of 590 deaf students graduating between 1956 and 1971 from the California School for the Deaf at Riverside. During this period the average reading achievement of the graduates increased. Students who attended the school for many years scored higher than those attending briefly, and deaf children of deaf parents scored higher than those of hearing parents. None of the achievement measures proved to be adequate predictors of students' later performance in college.

2.04 **DiFrancesca, S.** *Academic Achievement Test Results of a National Testing Program for Hearing Impaired Students. United States: Spring 1971.* Washington: Gallaudet College, Office of Demographic Studies, Report Series D, Number 9, 1972.

Presents the Stanford Achievement Test scores for 17,000 deaf students nationwide. The scores reveal a trend for hearing impaired students to achieve better in reading than other academic areas during the first 1 to 3 years of education. Thereafter, students achieve better in other low-verbal subject areas such as mathematics. The severity of hearing loss was found to have a much more serious effect on verbal areas than nonverbal academic skills.

2.05 **Furth, H.G.** "A Comparison of the Reading Test Norms of Deaf and Hearing Children," *American Annals of the Deaf*, 111 (1966), 461-462.

Presents the results of a reanalysis of test data published earlier. Only 12 percent of the deaf students, 11 to 16 years of age, read above grade level 4.9. The author argues that this represents not a true reading deficit but is an indication of the deaf students' lack of English language skills.

2.06 **Gentile, A., and S. DiFrancesca.** *Academic Achievement Test Performance of Hearing Impaired Students. United States: Spring 1969.* Washington: Gallaudet College, Office of Demographic Studies, Report Series D, Number 1, 1969.

Presents the results of a nationwide survey of over 12,000 hearing impaired children, using the Stanford Achievement Test. Norms

are provided for each age level and test form. The average reading achievement of hearing impaired 18-year-olds was only grade 5.88. The improvement from age 10 to 18 corresponded to an increase of 0.38 grade levels per year.

2.07 **Ives, L.A.** "A Screening Survey of 2,060 Hearing Impaired Children in the Midlands and North of England," *Teacher of the Deaf*, 1 (1977), 32-39.

Examines the social adjustment, receptive vocabulary, and reading and language skills of 90 percent of all known deaf students in Northern England. The British version of the Gates-MacGinitie Reading Test was used. Three percent of the partially hearing subjects and 11 percent of the totally deaf subjects were seriously deficient in reading, according to this test.

2.08 **Jensema, C.** *The Relationship between Academic Achievement and the Demographic Characteristics of Hearing Impaired Children and Youth*. Washington: Gallaudet College, Office of Demographic Studies, Report Series R, Number 2, 1975.

Examines the academic achievement of a nationwide sample of 6,873 hearing impaired students. Also examines the influence of age of onset of hearing loss, the degree of hearing loss, additional handicaps, ethnic background, and type of special educational program on academic achievement.

2.09 **Kyle, J.G., et al.** "Language Abilities of Deaf School Leavers," *Journal of the British Association of Teachers of the Deaf*, 2 (1978), 38-42.

During a three-year project, the academic achievement of all deaf school leavers in England and Wales (573 students) was tested. Hearing impaired school leavers were found to be 5 to 8 years retarded in reading (using Brimer's Wide-Span Test). Degree of hearing loss and IQ both affected academic scores, but the presence of internal speech seemed particularly important in predicting academic success.

2.10 **Trybus, R.J.** "What the Stanford Achievement Test Has to Say about the Reading Abilities of Deaf Children," in H. Reynolds (Ed.), *Gallaudet College Conference on Reading in Relation to Deafness*. Washington: Gallaudet College Press (in preparation).

Describes the research of the Office of Demographic Studies at Gallaudet College. Nationwide surveys of reading achievement show that even the top tenth percentile of deaf students read substantially below the average performance of hearing students. Demographic studies show that reading scores are most highly influenced by the amount of residual hearing present and the socioeconomic status of the family. Even though reading scores are

low, reading is the best communication mode for many deaf students.

2.11 **Trybus, R.J., and G. Buchanan.** "Patterns of Achievement Test Performance," *Studies in Achievement Testing, Hearing Impaired Students. United States: Spring 1971.* Washington: Gallaudet College, Office of Demographic Studies, Report Series D, Number 11, 1973.

About 300 hearing impaired students taking the Intermediate or Advanced levels of the Stanford Achievement Test were compared with the hearing students in the original standardization sample for this test. The deaf student sample is about 5 years older than the hearing sample because of reading deficit. Comparison among subtests showed that the hearing impaired students did relatively better in spelling, arithmetic computation, and social studies. The hearing impaired were weakest in word study skills, science, and paragraph meaning (reading comprehension).

2.12 **Trybus, R.J., and M.A. Karchmer.** "School Achievement Scores of Hearing Impaired Children: National Data on Achievement Status and Growth Patterns," *American Annals of the Deaf*, 122 (1977), 62-69.

Presents the results of the Hearing Impaired edition of the Stanford Achievement Test administered to 6,871 students aged 8-20. At age 20, the average student reads at about grade 4.5, or barely at a newspaper literacy level. Only 10 percent of the oldest group read above eighth grade level. A subgroup of 1,543 students tested both in 1971 and 1974 were studied for longitudinal trends. Students improved 0.3 grade levels per year, with improvement the same for all ages, ruling out the hypothesis that deaf students reach an academic plateau at around fourth grade.

The Achievement of Selected Subgroups

While the previous studies examined the achievement of deaf students, the following series examined the achievement of deaf adults and multihandicapped deaf students.

Particularly noteworthy is the finding that the academic deficits found for deaf students continue throughout the adult years. The only exception has been that of Murphy (2.16) who found that deaf students did as well in college as did hearing students. At that college, interpreters translated class discussions into sign language and students took notes for the deaf.* With relatively simple support resources, many deaf students can survive in colleges and other technical and professional institutions.

*Unlike hearing students who can listen while writing notes, when the deaf student looks down to write notes all outside communication stops, hence the need for notetakers.

2.13 **Hammermeister, F.K.** "Reading Achievement in Deaf Adults," *American Annals of the Deaf*, 116 (1971), 25-28.

60 deaf adults, having been out of school for 7 to 13 years, were retested using the Stanford Achievement Test. After leaving school their reading vocabularies increased, but no comparable growth in comprehension was found.

2.14 **Jensema, C.J.** "A Note on the Achievement Test Scores of Multiply Handicapped Hearing Impaired Children," *American Annals of the Deaf*, 120 (1975), 37-39.

Stanford Achievement Test grade equivalent scores from 16,822 hearing impaired students were examined. Eleven subgroups were formed, each subgroup consisting of students reported as having one of 11 additional handicapping conditions. Mean grade equivalents were calculated for each subgroup to demonstrate that each specific kind of additional handicap tends to exert a unique degree of influence on academic achievement.

2.15 **Jensema, C.** "A Note on the Educational Achievement of ODAS Members," *Volta Review*, 77 (1975), 135-137.

Surveys the academic achievement of the Oral Deaf Adults Section (ODAS) of the Alexander Graham Bell Association for the Deaf. Over 50 percent are college graduates and 16 percent hold advanced degrees. The author advocates further study of this group to determine what factors have led to their great academic success.

2.16 **Murphy, H.J.** "Comparative Studies of the Academic Achievement between Hearing Impaired and Nonhearing Impaired Students at California State University, Northridge," *American Annals of the Deaf*, 121 (1976), 305-308.

At CSU, Northridge, about 200 deaf students attend classes with hearing students. The hearing impaired students receive study aids and interpreters as needed, but participate fully in all classes. The author finds that the grade-point averages for the deaf students are not significantly lower than those for the hearing students, indicating that with supplemental assistance, deaf students can succeed in higher education.

2.17 **Phillips, R.M., and T.O. Berg.** "Use of the SRA Verbal and Nonverbal Forms at Gallaudet College," *Journal of Rehabilitation of the Deaf*, 11 (1978), 59-62.

Presents norms for using this test with deaf college students. These norms are based on a study of the performance of over 900 such students. The mean performance of this group was at the 76th percentile of hearing students for the nonverbal test and 20th percentile for the verbal test.

Psychometric Factors

While it is clear that deaf students score lower on achievement tests, do these findings mean the same for them as for hearing students? The next group of studies examine this concern by investigating three issues:

A. Are these tests reliable and valid?
B. To what extent has guessing inflated scores?
C. Are the low scores merely an artifact of poor phrasing of test questions?

2.18 **Bornstein, H.** "Some Effects of Verbal Load on Achievement Tests," *American Annals of the Deaf*, 116 (1971), 44-48.

In order to test the hypothesis that part of the poor test performance of deaf students in content areas can be attributed to the language complexity of the test items, the items from the STEP social studies test were rewritten in simplified English. 184 deaf college students took the test in both its original form and the simplified form. Simplifying the language produced a small, but noticeable increase in social studies scores.

2.19 **Bornstein, H., and B. Kannapell.** "More on the Effects of Verbal Load on Achievement Tests," *American Annals of the Deaf*, 116 (1971), 575-579.

Test items from the social studies portion of the SRA Achievement Tests were rewritten in simpler English to determine whether the low achievement test scores were attributable merely to the "verbal load" within these tests. The subjects were high school and college age deaf students. Reducing the verbal load produced only a very small improvement in test scores.

2.20 **Buchanan, C.** "The Discriminative Validity of Selected Subtests of the Stanford Achievement Test, Intermediate I Battery, for Hearing Impaired Students: Spring 1971," *Studies in Achievement Testing, Hearing Impaired Students. United States: Spring 1971.* Washington: Gallaudet College, Office of Demographic Studies, Report Series D, Number 11, 1973.

Examines the discriminative validity of five subtests of this test (Paragraph Meaning, Spelling, Arithmetic Computation, Arithmetic Applications, Science) by comparing the performance of the top 27th percentile with that of the lowest 27th percentile. All of the subtests showed fair to good discriminative validity between the two groups.

2.21 **DiFrancesca, A.** "The Reliability of the Stanford Achievement Test Primary II Battery for Hearing Impaired Students," *Studies in Achievement Testing, Hearing Impaired Students.*

United States: Spring 1971. Washington: Gallaudet College, Office of Demographic Studies, Report Series D, Number 11, 1973.

189 students who had participated in the 1971 nationwide survey of the reading achievement of hearing impaired students were retested with a parallel form of the test. The reliability of the Paragraph Meaning subtest was found to be 0.82, while Word Meaning was 0.69. Thus the test is a moderately reliable measure of reading performance.

2.22 **Jensema, C.** "A Comment on Measurement Error in Achievement Tests for the Hearing Impaired," *American Annals of the Deaf*, 123 (1978), 496-499.

Presents the reliability and standard error of measurement for the Hearing Impaired Edition of the Stanford Achievement Test. The implications of these measures and their proper use in interpreting student growth are considered. This test was found ineffective for measuring annual student academic growth.

2.23 **Moores, D.F.** "An Investigation of the Psycholinguistic Functioning of Deaf Adolescents," *Exceptional Children*, 36 (1970), 645-652.

The cloze procedure was used to test the reading skills of 37 deaf students and a control group of hearing students of equal reading ability. Despite being matched for overall reading ability on the Stanford Achievement Test, the deaf students scored much lower on the cloze test. The author concludes that standardized tests overestimate the actual reading and language skills of deaf students.

2.24 **Rister, A.** "Deaf Children in Mainstream Education," *Volta Review*, 77 (1975), 279-290.

88 deaf students who had attended the same preschool program were surveyed to determine their later academic success. Reports from parents indicated that 62 percent of the students now attended regular classes, and 64 percent were reported to be reading within one grade level of their grade placement. The author suggests that one reason for the low reading achievement scores observed in nationwide surveys is that these surveys often miss the deaf students who are successfully mainstreamed in public school.

2.25 **Trybus, R.J.** "Intercorrelations among Subtests of the Stanford Achievement Test, Hearing Impaired Students: United States, Spring 1971," *Further Studies in Achievement Testing, Hearing Impaired Students. United States: Spring 1971.* Washington: Gallaudet College, Office of Demographic Studies, Report Series D, Number 13, 1973.

Compares the pattern of subtest intercorrelation in the Stanford Achievement Test for hearing impaired students and for hearing students. The intercorrelation among subtests was much lower for the deaf students in most instances.

2.26 **Trybus, R.J., and P.J. Sepielli.** "Guessing of Chance Level Responses in the Stanford Achievement Test, Hearing Impaired Students: United States, Spring 1971," *Further Studies in Achievement Testing, Hearing Impaired Students. United States: Spring 1971.* Washington: Gallaudet College, Office of Demographic Studies, Report Series D, Number 13, 1973.

Reviews the literature on random guessing effects in multiple choice tests such as the Stanford Achievement Test. The application of correction for guessing formulas to the 1971 data of reading achievement of deaf students suggests that random guessing by students is not a serious problem with this test. Fewer than 10 percent of the students fall within the realm of scores attributable to such effects.

2.27 **Walter, J.** "The Reading of Paragraphs," *American Annals of the Deaf*, 114 (1969), 71-75.

Compares the reading comprehension of deaf students from Australia with that of deaf students in the United States. Since the test used was developed in Australia, the author examines in detail differences in the testing approaches between the two continents.

2.28 **Wilson, K., M. Karchmer, and C. Jensema.** "Literal vs. Inferential Item Analysis of Reading Achievement in Hearing Impaired Students," in H. Reynolds (Ed.), *Gallaudet College Conference on Reading in Relation to Deafness.* Washington: Gallaudet College Press (in preparation).

The authors use item analysis of student responses on the Stanford Achievement Test used in the nationwide survey of hearing impaired students. Construction deficits in the test prevented a clear comparison of these two components of comprehension. Only the more advanced levels of the test contain inference questions, and within these levels the inference questions are clustered toward the end of the test where items are harder to read. After correcting for these defects, no difference between literal and inferential comprehension was found for deaf students.

Factors Influencing Academic Achievement

What factors within the background of the student or the educational program lead to improved reading skills?

The most vigorous debate within this section centers on the choice of instructional approach with oralists and manualists both asserting the

superiority of their systems. The major data base underlying this debate has been the finding that deaf children of deaf parents typically read better than those of hearing parents. Manualists argue that this improvement is because deaf children of deaf parents are usually exposed to signing from birth onward. Oralists often argue that this conclusion is unfounded since other factors may account for this difference. Deaf parents may be more able to accept the deaf child and understand that child's needs. Deaf children of deaf parents are more often the result of hereditary causes and, hence, less affected by other biological complications.

2.29 **Brasel, K.E., and S.P. Quigley.** "Influence of Certain Language and Communication Environments in Early Childhood on the Development of Language in Deaf Individuals," *Journal of Speech and Hearing Research*, 20 (1977), 95-107.

Four groups of deaf students were tested using the Stanford Achievement Test and the Test of Syntactic Abilities. The four groups were: deaf children of deaf parents who used manual communication but with good English language skills (manual English); deaf children of deaf parents who used American Sign Language (average manual); deaf children of hearing parents who sent their children to intensive oral-emphasis preschools (intensive oral); and deaf children of hearing parents who did not send their children to a preschool program (average oral). Exposure to manual English resulted in the greatest academic achievement. Average manual was the next most effective, followed by intensive oral and average oral. The authors conclude that manual English is superior to American Sign Language for developing English language skills.

2.30 **Chambers, J.F.** "Predicting the Academic Achievement Level of Deaf Students," *Dissertation Abstracts International*, 31A (1971), 6396. University Microfilms No. 71-15924.

232 deaf students aged 16 or above were tested using the Stanford Achievement Test. Reading scores were then compared to various background variables. Students whose deafness was caused by hereditary factors read better than those whose deafness was caused by illness such as measles or rubella. Likewise a deaf child of deaf parents or a deaf child with deaf siblings reads better than one whose parents and siblings all hear normally.

2.31 **Chasen, B., and W. Zuckerman.** "The Effects of Total Communication and Oralism on Deaf Third Grade 'Rubella' Students: An Exploratory Study," *American Annals of the Deaf*, 121 (1976), 394-404.

15 fifteen-year-old deaf students whose deafness was caused by rubella (German measles) were studied to explore the relative effectiveness of Total Communication and oral instruction. After

one year of instruction, the students attending T.C. class performed better in mathematics and overall communication skills, but were not better in reading than those attending the oral class.

2.32 **DiCarlo, L.M.** "Much Ado about the Obvious," *Volta Review*, 68 (1966), 269-273.

Reviews the major studies on the relationship of early exposure to sign languages to later academic achievement. The author finds the evidence inconclusive and often misinterpreted and concludes that the superiority of early manual communication remains unproven.

2.33 **Hamp, N.W.** "Reading Attainment and Some Assorted Factors in Deaf and Partially Hearing Children," *Teacher of the Deaf*, 70 (1972), 203-215.

367 hearing impaired children aged 9-16 were tested as part of validating the Reading Vocabulary Picture Test. The author also examines the effects of type of school placement, age, degree of hearing loss, sex, and intelligence on test performance.

2.34 **Harris, R.I.** "The Relationship of Impulse Control to Parent Hearing Status, Manual Communication, and Academic Achievement in Deaf Children," *American Annals of the Deaf*, 123 (1978), 52-67.

Deaf children were classified as reflective or impulsive based on their behavior in tests involving matching and drawing figures. Reflective children had superior IQ scores and academic achievement. Deaf children exposed to manual communication in early childhood were more reflective than those exposed to oral communication only.

2.35 **Lane, H.S.** "The Profoundly Deaf: Has Oral Education Succeeded?" *Volta Review*, 78 (1976), 329-340.

Reviews many of the criticisms often levied against oral education for the deaf. Academic success has not been limited to students of superior IQ with moderate hearing losses acquired after infancy. The author argues that oral training leads to better integration with hearing adults.

2.36 **Lane, H.S., and D. Baker.** "Reading Achievement of the Deaf: Another Look," *Volta Review*, 76 (1974), 489-499.

The study compares the reading scores of 132 former pupils of the Central Institute for the Deaf between the ages of 20 and 16, with scores reported from other studies. The students at this school show a steady improvement from year to year. The final score for eighth grade graduates was 6.2, higher than that reported in most studies of the reading achievement of deaf students. The authors argue

that this superior performance is the result of the school's continued emphasis on language development and oral communication.

2.37 **Meadow, K.P.** "Early Manual Communication in Relation to the Deaf Child's Intellectual, Social, and Communicative Functioning," *American Annals of the Deaf*, 113 (1968), 29-41.

59 deaf children of deaf parents were matched in sex, age, and IQ with deaf children of hearing parents to determine whether early exposure to sign systems affects children's later development. The deaf children of deaf parents read 2.1 grade levels higher and showed better social adjustment. They were not deficient in speech or speechreading skills and communicated through print media better than deaf children of hearing parents.

2.38 **Moores, D.F., C.K. McIntyre, and K. Weiss.** "Gestures, Signs, and Speech in the Evaluation of Programs for Hearing Impaired Children," *Sign Language Studies*, 2 (1973), 9-28.

Reports the third year findings of a five year project to assess the effectiveness of preschool programs. All students were administered the ITPA and several scales of receptive communication skills. Successful programs were found to be those with a heavy emphasis on prereading and readiness activities, and which emphasized oral and manual communication throughout the day.

2.39 **Morris, T.** "Some Observations on the Part Played by Oral Teaching Method in Perpetuating Low Standards of Language Achievement in Severely and Profoundly Deaf Pupils," *Journal of the British Association of Teachers of the Deaf*, 2 (1978), 130-135.

Reviews British and American studies of the inadequate student growth in vocabulary, speechreading, and reading. The author concludes that these deficiencies are a direct result of the widespread emphasis on oral/aural communication, and calls for educators to consider other approaches to language development.

2.40 **Neyhus, A.I., and H.R. Myklebust.** *Speechreading Failure in Deaf Children, Final Report*. Evanston, Illinois: Northwestern University, 1969. Eric Document Reproduction Service No. ED 038 816.

Compares 30 deaf children with good speechreading skills with an equal number of students with poor speechreading skills. Students with superior speechreading skills also had higher IQ, reading achievement, and written language scores.

2.41 **Nix, G.W.** "Total Communication: A Review of the Studies Offered in its Support," *Volta Review*, 119 (1975), 470-494.

Reviews 17 studies commonly cited as evidence of the effectiveness of Total Communication and the ineffectiveness of the oral approach. The author finds that many of these studies have been misinterpreted or contain serious flaws.

2.42 **Perman, B.Z.** "Reading Attainment in Hearing Impaired Children: A Comparison of Higher and Lower Achievers," *Journal of Communication Disorders*, 11 (1978), 227-235.

Two oral schools for the deaf were compared using eight deaf students from each school. These students were matched in age, IQ, and degree and age of hearing loss. In one school the students read substantially better despite their being matched on background variables. The superior school performance was related to that school's program of language development through rich and varied experiences accompanied by emphasis on the patterns of English.

2.43 **Quigley, S.P.** *The Influence of Fingerspelling on the Development of Language, Communication, and Educational Achievement in Deaf Children.* Urbana: University of Illinois, 1969. Eric Document Reproduction Service No. ED 035 998.

Compares the effectiveness of the Rochester Method (fingerspelling combined with speech) with oral methods for developing language skills in the deaf. After five years, students taught by the Rochester Method showed equal or better speechreading, reading, and writing skills than children trained by oral methods alone, although the differences between groups were small. The author concludes that the simultaneous use of fingerspelling and speech can be helpful for deaf students.

2.44 **Redgate, G.W.** "Research into the Teaching of Reading to Deaf Children," *Annual Report: Department of Audiology and Education of the Deaf, University of Manchester.* Manchester, England: 1973. Eric Document Reproduction Service No. ED 088 068.

The effectiveness of the Initial Teaching Alphabet (i.t.a.) was tested using 245 students and i.t.a. was not found to be more effective than traditional orthography. Other analysis showed that the Peabody Picture Vocabulary Test was the best single predictor of reading success. Reading scores were highly correlated to language ability measures (r = .6-.7) and unrelated to the amount of residual hearing aid usage (r = .074) or whether the student's family had received preschool guidance services (r = .068).

2.45 **Restaino, L.C.R.** *Identification, Assessment, and Prediction of Reading Competency in Deaf Children, Final Report.* New York: Lexington School for the Deaf, 1968. Eric Document Reproduction Service No. ED 030 254.

Tested 79 poor reading and 65 good reading deaf students to determine those factors most related to success in reading. Most of the tests focused on perceptual and memory skills of the two groups.

2.46 **Ries, P.** "Associations between Test Performance and Selected Characteristics of Hearing Impaired Students in Special Education Programs: United States, Spring 1971," *Further Studies in Achievement Testing, Hearing Impaired Students. United States: Spring 1971.* Washington: Gallaudet College, Office of Demographic Studies, Report Series D, Number 13, 1973.

Reports on the effect of various demographic factors in the reading and math achievement of deaf students. Students who spent only part of their day in special education programs read on the average 1.14 grade levels above those in full time programs. Students with nonverbal IQ scores over 96 read .80 grades above those with IQ scores less than 96. Students without additional handicaps read .63 grade levels above those with multiple handicaps. No other demographic factors produced reading score differences greater than .05 grade levels.

2.47 **Stuckless, E.R., and J.W. Birch.** "The Influence of Early Manual Communication on the Linguistic Development of Deaf Children," *American Annals of the Deaf*, 111 (1966), 452-460.

Compares the academic performance of 38 deaf children of deaf parents who used manual signs with their children since birth with 38 deaf children of hearing parents who did not use signing. Children exposed to signing in early childhood scored higher in reading, writing, lipreading, and social adjustment. There was no difference between groups in speech intelligibility.

2.48 **Vernon, M., and S.D. Koh.** "Early Manual Communication and Deaf Children's Achievement," *American Annals of the Deaf*, 115 (1970), 527-536.

Reviews eight prior studies which found that children exposed to manual communication in early childhood did better in reading and mathematics in later years without any serious loss in other communication skills. The authors compare the academic performance of 32 deaf children of deaf parents with a matched sample of deaf children of hearing parents. Those exposed to manual communication (children of deaf parents) read about 1.5 grade levels higher and showed speechreading skills as good as children exposed only to oral communication.

2.49 **Vernon, M., and S.D. Koh.** "Effects of Oral Preschool Compared to Early Manual Communication on Education and

Communication in Deaf Children," *American Annals of the Deaf*, 116 (1971), 569-574.

Deaf children who had early manual communication experience but not preschool education were found to read better than deaf children who had received intensive preschool oral instruction. There was no difference among the students in speech or speech-reading abilities. The authors argue that early exposure to manual communication is beneficial for deaf children.

Part 3 BASIC RESEARCH ON READING AND LANGUAGE SKILLS

The previous chapter clearly demonstrated that the hearing impaired student reads less well than hearing students of similar age. This chapter reviews the research describing how the child develops reading and language skills. Do they acquire these skills in the same manner as hearing students? What reading cues are available to the deaf reader?

Models of Reading and Language

The following papers present either specific models of the reading and language skills of deaf learners, or some of the theoretical issues underlying such models. Many of these papers attempt to apply ideas developed in other disciplines to deaf education. Current movements include miscue analysis, psycholinguistic modeling, and bilingual-bicultural education. The application of these ideas remains unclear. How do these concepts change the way one views deafness and deaf education? Are these new ideas fully appropriate? How must the models themselves change to accommodate the unique characteristics of deafness? These questions will lead to continued model building and research in the coming years.

3.01 **Athey, I.** "Language, Reading, and the Deaf," in H. Reynolds (Ed.), *Gallaudet College Conference on Reading in Relation to Deafness*. Washington: Gallaudet College Press (in preparation).

Reviews the current research on language development in hearing and deaf students with consideration given to the implications of this work to reading. Particular emphasis is given to changes in syntactic, semantic, and discourse processing skills which take place during school years. Models of the reading development of deaf students must consider not only the perceptual aspects of reading but also the child's cognitive, linguistic, and social development.

3.02 **Bonvillian, J.D., V.R. Charrow, and K.E. Nelson.** "Psycholinguistic and Educational Implication of Deafness," *Human Development*, 16 (1973), 321-345.

Reviews the research on language and cognitive development and the educational achievement of the deaf. The authors conclude that the deaf are not cognitively handicapped despite obvious language problems. Many deaf individuals communicate effectively through signs despite English language deficits. Thus sign language must be seen as a system separate from English. The authors advocate increased use of sign languages with deaf children.

3.03 **Charrow, V.R., and J.D. Fletcher.** "English as the Second Language of Deaf Children," *Developmental Psychology*, 10 (1974), 463-470.

Compares the reading performance of deaf children of deaf and hearing parents on the Stanford Achievement Test and the Test of English as a Foreign Language. Deaf children of deaf parents scored higher and with a pattern similar to that of hearing children from an English as a second language background. The authors advocate early exposure to sign language to facilitate later learning of English.

3.04 **Cicourel, A.V., and R.J. Boese.** "Sign Language Acquisition and the Teaching of Deaf Children," *American Annals of the Deaf*, 117 (1972), 27-33; 403-411. Also in D. Hymes, C. Cazden, and V. Johns (Eds.), *Functions of Language: An Anthropological and Psychological Approach*. New York: Teachers College Press, 1972.

Reviews the research on early language development in hearing and deaf children and concludes that deaf children acquire sign language through processes analogous to the way hearing children acquire spoken language. For educational planning, the deaf child must be seen as a bilingual child whose native language is signing.

3.05 **Cornett, R.O., et al.** "A Theoretical Model of the Development of Reading in a Hearing Impaired Child," in H. Reynolds (Ed.), *Gallaudet College Conference on Reading in Relation to Deafness*. Washington: Gallaudet College Press (in preparation).

Presents a theoretical model of the reading development of hearing impaired children who communicate through various communication systems. The authors attempt to contrast the probable differences in reading growth arising from different systems. Particular emphasis is given to presenting questions for future investigation.

3.06 **Ewoldt, C.** "Reading for the Hearing or Hearing Impaired: A Single Process," *American Annals of the Deaf*, 123 (1978), 945-948.

A descriptive study of the reading behavior of four deaf children reveals that they use the same strategies as have been identified in

miscue analysis with hearing students. Despite obvious differences in language background, the reading process is very similar for deaf and hearing students.

3.07 **Geoffrion, L.D., and I. Athey.** "Reading as Information Processing: Postconference Reflections," in H. Reynolds (Ed.), *Gallaudet College Conference on Reading in Relation to Deafness*. Washington: Gallaudet College Press (in preparation).

This paper largely responds to the model of reading proposed by Gallaudet College (3.05). Reading models must consider the role of reading as a communication medium rather than merely the decoding of words. As such, one must examine the cognitive, linguistic, and motivational factors within the deaf child in order to model how that child learns to read. Several research ideas are proposed based on this perspective.

3.08 **Knight, D.L.** "A General Model of English Language Development as a Prerequisite to the Acquisition of Reading in Hearing Impaired Children," in H. Reynolds (Ed.), *Gallaudet College Conference on Reading in Relation to Deafness*. Washington: Gallaudet College Press (in preparation).

Presents a model of the language development of deaf and normal hearing children with emphasis on the prereading years. The author particularly focuses on those conditions that lead to developing full language competence.

3.09 **Kretschmer, R.R., and L.W. Kretschmer.** *Language Development and Intervention with the Hearing Impaired*. Baltimore: University Park Press, 1978.

Designed as a textbook on teaching language to deaf students, one chapter reviews the relationship of reading and language in deaf children. Emphasis is given to instructional applications.

3.10 **Moores, D.F.** *Education of the Deaf in the United States, Occasional Paper* 2. Minneapolis: University of Minnesota, 1970. Eric Document Reproduction Service No. ED 079 907.

Reviews recent research on language and cognitive development in deaf students and the resulting controversies over the optimal instructional approach.

3.11 **Tomlinson-Keasey, C., and R.R. Kelly.** "The Deaf Child's Symbolic World," *American Annals of the Deaf*, 123 (1978), 452-459.

The very low achievement scores of deaf students are contrasted with their near normal performance in tests of nonverbal IQ and conceptual development. The authors conclude that the lack of

exposure to symbols during the preschool years leads to an information processing system qualitatively different from that of hearing students.

Descriptive Studies

The following papers describe broad aspects of the reading performances of deaf individuals. Three types of studies have been found:

1. Research on the reading habits of the deaf.
2. Eye movement research.
3. Miscue analysis research.

3.12 **Andrews, J.** "What Do Deaf Adults Read?" *Journal of Rehabilitation of the Deaf*, 11 (1978), 9-22.

Compares the reading habits and interests of 50 hearing college students with 64 deaf college students and 36 deaf adults who did not attend college. The three groups were essentially similar in their reading interests. All groups read newspapers and magazines about equally, although the noncollege deaf adults read many fewer books than the other two groups.

3.13 **Blea, W.** "A Photographic Study of the Eye Movements of Profoundly Deaf Children During the Process of Reading," doctoral dissertation, University of Kansas, 1967. *Dissertation Abstracts International*, 28 (1968), 4473A. University Microfilms No. 68-6, 948.

The Reading Eye camera was used to compare the eye movements of 70 deaf students to those of hearing students of equal reading ability. The deaf students made more regressions while reading (moving the eyes back to reread a section) but otherwise behaved similarly to hearing students.

3.14 **Ewoldt, C.K.** "A Psycholinguistic Description of Selected Deaf Children Reading in Sign Language," doctoral dissertation, Wayne State, 1977. *Dissertation Abstracts International*, 38 (1977), 2702A. University Microfilms No. 77-23, 972.

Presents the results of a pilot study to examine the reading miscues of four deaf students who read using sign language instead of oral reading. All reading miscues were analyzed through Goodman's miscue analysis. The deaf students typically made more miscues and corrected themselves less often. Many miscues were translations of English into ASL structures. A reading model similar to Goodman's is proposed to account for these reading behaviors.

3.15 **McLaughlin, J., and J. Andrews.** "The Reading Habits of Deaf Adults in Baltimore," *American Annals of the Deaf*, 120 (1975), 497-501.

36 deaf adults were interviewed to discover the extent and nature of reading materials they enjoyed. While they read less than hearing adults, their reading habits were very similar. The most popular materials were the daily newspapers and magazines. Books were read less often. Individuals over age 50 read more than younger adults. Those adults who used manual communication in school read more than those who used only the oral method in school.

3.16 **Reich, P.A., and C.M. Reich.** *A Follow-Up Study of the Deaf.* Toronto: Toronto University, 1974. Eric Document Reproduction Service No. ED 090 729.

278 deaf adults were surveyed and interviewed to determine their communicative skills and preferences. Most prefer using speech with hearing friends, and signing with deaf friends, but rely on writing for critical communication such as a visit to their doctor. The median reading achievement was about third grade. Reading the newspaper was the preferred leisure reading activity.

Word Recognition Research

If many deaf students have only poor familiarity with the sounds and grammar of English, what strategies are available to them to recognize words? Can deaf students use phonics even when they have little firsthand knowledge of how a word should sound?

The most interesting result from these studies is the observation that deaf students are aware of the spelling patterns within words. On the practical side, this demonstrates a valuable word attack strategy available to them. On the theoretical side, it permits one to distinguish between whether students recognize regular words more easily because they are pronounceable or because they are spelled regularly. Since deaf students are facilitated as well, the regularity of spelling patterns seems to be more important than pronounceability.

3.17 **Blanton, R.L., J.C. Nunnally, and P.B. Odom.** "Graphemic, Phonetic, and Associative Factors in the Verbal Behavior of Deaf and Hearing Subjects." *Journal of Speech and Hearing Research,* 10 (1967), 225-231.

Deaf and hearing subjects were compared on several tasks to assess the relevant cues in the decoding of words. Deaf subjects tended to rely more on graphemic cues than hearing subjects. In a task where subjects had to remember pairs of words, deaf student performance was superior to that of the hearing subjects. The authors conclude that the lack of auditory-vocal cues does not hinder the storage and retrieval of individual words in the deaf.

3.18 **Friedman, J.B.** "Perception of Orthographic Structure in the Mature Deaf Reader," doctoral dissertation, Rutgers, 1976.

Dissertation Abstracts International, 37 (1976), 3516A. University Microfilms No. 76-27321.

31 deaf college students were compared with 31 hearing students of the same age and 31 hearing students of the same reading ability. Their task was to read rapidly-presented pseudowords. Two types of pseudowords were used: pseudowords corresponding to normal spelling patterns (DINK, TILMS) and pseudowords that violate spelling patterns (NKID, LMSIT). All groups were more accurate with regular pseudowords. The deaf were just as successful as hearing subjects in using spelling patterns to facilitate rapid word recognition.

3.19 **Friedman, J.B., and W.B. Gillooly.** "The Effect of Orthographic Structure on the Perception of Letter Sequences by Deaf and Hearing Children." paper presented at the annual meeting of American Educational Research Association, Washington, 1975. Eric Document Reproduction Service No. ED 112 572.

Deaf and hearing students from grades 1, 2, and 4 were tested on their ability to recognize nonsense words that either conformed to English patterns (VUNS) or violated such patterns (NSUV). Both deaf and hearing students found that spelling regularity helped in remembering a word that was rapidly presented.

3.20 **Gibson, E.J., A. Shurcliff, and A. Yonas.** "Utilization of Spelling Patterns by Deaf and Hearing Subjects," in H. Levin and J. Williams (Eds.), *Basic Studies in Reading*. New York: Basic Books, 1970.

34 deaf college students were compared with 34 hearing students in their ability to recognize pseudowords which were either spelled regularly or irregularly. While the deaf students were less accurate overall, both groups were better able to recognize pseudowords spelled like plausible words than those spelled irregularly.

3.21 **Hartung, J.E.** "Visual Perceptual Skill, Reading Ability, and the Young Deaf Reader," *Exceptional Children*, 36 (1970), 603-608.

The visual perceptual skills of beginning readers were tested by presenting Greek and English trigrams. Deaf children equalled the hearing children in their ability to recognize the trigrams, and surpassed the hearing children in copying the trigrams from memory. The reading difficulties of deaf students cannot be attributed to visual perceptual deficits.

3.22 **Kelly, R.R., and C. Tomlison-Keasey.** Hemispheric Laterality of Deaf Children for Processing Words and Pictures Visually to the Hemifields," *American Annals of the Deaf*, 122 (1977), 525-533.

The hemispheric laterality of 39 deaf children was compared by presenting pairs of words or pictures in the right or left visual field. Unlike hearing children who usually show a left hemispheric superiority for words, the deaf children showed no superiority of one hemisphere of the brain over the other in processing words. The deaf child's lack of exposure to sounds may prevent the development of laterality within the brain.

3.23 **McIntyre, C.W., R.D. Odom, and M. Byassee.** "The Influence of Congenital Deafness on Processes Concerned with Reading: An Initial Investigation," *Journal of Reading Behavior*, 3 (1971), 36-41.

Examines the cues used by deaf first graders to read individual words. The experimenters found that words were remembered by their visual distinctive features rather than matching to a prototype.

3.24 **Stone, R.E.** "Factors Affecting the Tachistoscopic Recognition of Trigrams for Both Deaf and Hearing College Students," in H. Reynolds (Ed.), *Gallaudet College Conference on Reading in Relation to Deafness*. Washington: Gallaudet College Press (in preparation).

Trigrams which were either pronounceable (MEK) or unpronounceable (MKE) were presented tachistoscopically to normal hearing students, orally-trained deaf students, and nonoral deaf students. All three groups found pronounceable trigrams easier to recognize. Thus deaf adults attend to spelling patterns in word recognition even when their oral communication skills are poor.

3.25 **Zakia, R.D.** *Fingerspelling and Speechreading as Visual Sequential Processes*. Rochester, New York: Rochester Institute of Technology, 1972. Eric Document Reproduction Service No. ED 066 847.

Compares the ability of deaf and hearing college students to read words when the letters are sequentially presented on a visual display. The deaf students correctly identified more words than the hearing students and both were affected similarly by word length, imagery, and presentation rate. Within the deaf sample, fingerspelling skill was highly correlated (r = 0.5 to 0.7) with reading ability in this task. Speechreading was not correlated to reading the words (r = .06 to .24).

3.26 **Zakia, R.D., and R.N. Haber.** *Sequential Letter and Word Recognition*. Rochester, New York: Rochester Institute of Technology, 1972. Eric Document Reproduction Service No. ED 058 700.

33 deaf college students were compared with hearing students in reading words when fingerspelled or spelled letter by letter on a TV

screen. Deaf subjects were superior to hearing students in recognizing a word when sequentially spelled. Both groups did better on high imagery words and worse on longer words or when spelling rates were accelerated.

Vocabulary Skills

These studies examine the vocabulary of deaf students of various ages. One common adaptation of vocabulary tests such as the Peabody Picture Vocabulary Test has been to allow deaf students to read the target word as well as hear (or speechread) it. Hence, such studies are considered measures of reading vocabulary even though the tests are not explicitly designed as reading tests. Note also that some of the studies cited in Chapter Two present data on reading vocabulary as well.

3.27 **Forde, J.** "Data on the Peabody Picture Vocabulary Test," *American Annals of the Deaf*, 122 (1977), 38-43.

The Peabody Picture Vocabulary Test was modified to accomodate deaf students by including reading the word along with residual hearing and speechreading. Despite these adaptations the vocabulary scores obtained were low for all ages. Students with partial hearing show larger receptive vocabularies than those with profound deafness.

3.28 **Griswold, L.E.** "The Expressive Vocabulary of Preschool Deaf Children," *American Annals of the Deaf*, 119 (1974), 16-28.

Based on a study of 19 preschool deaf students, a composite vocabulary list of 493 words used by 2 or more students is provided. This list is much smaller than comparable lists for hearing students. The amount of preschool education and the use of Total Communication were correlated with larger expressive vocabularies.

3.29 **Koplin, J.H., et al.** "Word Association Test Performance of Deaf Students," *Journal of Speech and Hearing Research*, 10 (1967), 126-137.

The word associations of deaf and hearing students were compared to examine the vocabulary growth of deaf students. The authors conclude that the word associations of the deaf are comparable to those of younger hearing subjects.

3.30 **Morris, T.** "A Comparison of the Receptive Oral Language Development of Children Educated in Schools for the Deaf in Two English Speaking Countries," *Journal of the British Association of Teachers of the Deaf*, 2 (1978), 58-60.

The Peabody Picture Vocabulary Test is used to compare the oral receptive vocabulary of Canadian and British deaf students aged 6

to 12 years. The overall performance was very similar for both groups. When compared to the norms for hearing students, the deaf students show vocabulary scores 5 to 8 years below that of hearing students.

3.31 **Nunnally, J.C., and R.L. Blanton.** "Patterns of Word Association in the Deaf," *Psychological Reports*, 18 (1966), 87-92.

Compares the word associations of deaf and hearing students. The deaf gave more associations that could have been learned from visual experiences and from reading simple material and gave fewer associations derived from more subtle understanding of the English language. Words are less meaningful to deaf students than to hearing students.

3.32 **Schulze, G.B.** "An Evaluation of Vocabulary Development by Thirty-Two Deaf Children over a Three Year Period," *American Annals of the Deaf*, 110 (1965), 424-437.

Writing samples from 32 deaf students aged 12-16 were gathered and analyzed to tabulate the expressive vocabulary of these students. There is about a four year delay in vocabulary development when compared to hearing students. While their vocabularies continue to grow each year, the rate of growth for deaf students is slower than for hearing students.

3.33 **Silverman-Dresner, T., and G.R. Guilfoyle.** *The Deaf Child's Knowledge of Words, Final Report.* New York: Lexington School for the Deaf, 1970. Eric Document Reproduction Service Nos. ED 046 210 and ED 046 211.

Tests the reading vocabulary of 13,207 deaf students aged 2-17. The results show girls know more words than boys and that vocabulary increases with age. Included is a list of 7300 words, their definitions, and the percentage of deaf students correctly identifying each one.

Memory Factors in Reading

Research with hearing students has long demonstrated the primacy of acoustic codes in reading or remembering information. Even in silent reading where there are no overt signs of speech, experiments show that students initially store the text in a phonemic-based code. Later recall (long term memory) is based on semantic or thought units, but initial memory (short term memory) is based on sounds.

If deaf students have poor familiarity with sounds, how then do they store information for later recall? These studies suggest that many store the information using codes based on their preferred communication system, whether that be sounds, signs, or fingerspelling.

3.34 **Blanton, R.L., P.B. Odom, and C.W. McIntyre.** *Symbolic and Linguistic Processes in the Deaf, Final Report.* Nashville, Tennessee: Vanderbilt University, 1971. Eric Document Reproduction Service No. ED 064 845.

Reports the results of 20 studies examining the reading and memory processes of deaf students. The overall conclusion of the studies suggests that deaf students remember words according to their sign equivalent and read better when passages are presented in sign order rather than English word order.

3.35 **Conrad, R.** "Short-Term Memory Processes in the Deaf," *British Journal of Psychology*, 61 (1970), 179-195.

Compares deaf students' ability to remember consonant sequences after reading silently and orally. Post-hoc error analysis showed two distinct groups among the deaf students; those relying upon an articulatory code and those using other codes. The articulatory coding students read equally well both orally and silently, while the nonarticulatory students were noticeably worse when reading aloud. These differences were further confirmed in a second experiment using words instead of consonants.

3.36 **Conrad. R.** "How Do the Deaf Remember Words?" *Teacher of the Deaf*, 68 (1970), 3-12.

Compares the short-term memory confusions of deaf students with those of hearing adults when recalling visually-presented letter strings. Two distinct error patterns among the deaf students were observed. One group appeared to use phonological coding and confused similar sounding letters (B, C, T, ...), while the other group used a visual code, as shown by memory errors confusing visually similar letters (R, X, Y). Hearing subjects rely solely on phonological codes. The educational implications of this difference in memory codes are presented.

3.37 **Conrad, R.** "Some Correlates of Speech Coding in the Short-term Memory of the Deaf," *Journal of Speech and Hearing Research*, 16 (1973), 375-384.

The short-term memory errors of deaf and hearing students were compared in an experiment involving the recall of consonant strings visually presented. Some deaf students appear to remember letters through an articulatory code while others use a visual code. The selection of memory code is not related to the student's IQ, but may be linked to the amount of oral training the deaf student receives.

3.38 **Locke, J.L.** "Phonemic Effects in the Silent Reading of Hearing and Deaf Children," *Cognition*, 6 (1978), 175-187.

24 deaf students and hearing children were asked to read silently a story and cross out every appearance of a target letter. The author compared the students' ability to detect the presence of a letter when that letter is pronounced in the word (*g* in *ghost*) or silent (*g* in *rough*). Hearing students detect the silent letter less often demonstrating that they use phonemic coding when reading silently. Deaf students detect silent and sounded letters equally often, suggesting that they do not use a phonemic-based code when reading.

3.39 **McGuigan, F.J.** *Covert Response Patterns in Processing Language Stimuli, Final Report.* Hollins College, Virginia: Hollins College, 1972. Eric Document Reproduction Service No. ED 066 980.

Electromyographic recordings were used to detect covert muscle action by hearing and deaf adults while reading silently, thinking, or doing mental arithmetic. Deaf individuals who communicate through signing send signals to the arms just as a hearing person sends covert signals to the speech muscles when processing language information silently.

3.40 **Odom, P.B., R.L. Blanton, and C.K. McIntyre.** "Coding Medium and Word Recall by Deaf and Hearing Subjects," *Journal of Speech and Hearing Research*, 13 (1970), 54-58.

Deaf and hearing students were asked to read and remember two word lists. One list contained words which have a direct sign language equivalent, while the other list contained words of equal frequency but which lack a simple sign language equivalent. The deaf students remembered the word list having sign equivalents better than the other list, suggesting that signs are used directly in the reading and memory processes of these students.

Language and Comprehension Research

These studies examine the deaf student's ability to comprehend reading materials. Included within this section are several studies of language skills since these studies involve reading as the primary testing medium. Because of the overlap between comprehension research and language research, this section is the least complete sample of the available research since there exist several hundred papers on the language development of the deaf. The papers presented herein were chosen because they represented aspects of particular interest to the reading teacher.

3.41 **Cohen, S.R.** "Predictability of Deaf and Hearing Story Paraphrases," *Journal of Verbal Learning and Verbal Behavior*, 6 (1967), 916-921.

46 deaf and 46 hearing students of the same reading ability read a brief story and then rewrote that story in their own words. Both the original story and the students' paraphrases were reread using the cloze procedure to measure the predictability of the stories. Hearing students found the language in the deaf compositions less predictable, while the deaf students found both the original story and the paraphrases equally difficult. The author argues that hearing students are more aware of the predictability in good English grammar.

3.42 **Conley, J.E.** "The Role of Idiomatic Expressions in the Reading of Deaf Children," *American Annals of the Deaf*, 121 (1976), 381-385.

Deaf and hearing children of the same reading ability were given a test of their comprehension of common English idioms. The deaf students were significantly inferior in their understanding of the idioms. This difference was most noticeable for those students reading above the third grade level. Scores on the idiom test significantly correlated to overall reading ability for both groups.

3.43 **Conrad, R.** "The Effect of Vocalizing on Comprehension in the Profoundly Deaf," *British Journal of Psychology*, 62 (1971), 147-150.

12 hearing and 32 deaf students were tested for reading comprehension following either oral or silent reading. The deaf students were selected, based on prior studies, to represent both students who use an articulatory memory code and students who use other codes. Both groups of deaf students read equally well silently but the students who used a nonarticulatory code found that oral reading reduced comprehension.

3.44 **Cooper, R.L.** "The Ability of Deaf and Hearing Children to Apply Morphological Rules," *Journal of Speech and Hearing Research*, 10 (1967), 77-86.

140 deaf students aged 7-9 were tested on their knowledge of various morphological rules (the ability to apply correctly the rules governing the use of morphemes such as -s, -ed, -ly). Deaf students scored lower overall than hearing students, but the relative difficulties of various rules were identical for both groups. Knowledge of these rules was found to be highly correlated to reading achievement scores for both groups.

3.45 **MacGinitie, W.H.** "Ability of Deaf Children to Use Different Word Classes," *Journal of Speech and Hearing Research*, 7 (1964), 141-150.

30 deaf and 30 hearing students of the same reading ability were given a word completion test where one word was deleted from each

sentence. The deaf students were much less successful than hearing students of the same reading ability. The pattern of difficulty for various form classes was very similar for both groups.

3.46 **Marshall, W.A.** "Contextual Constraint on Deaf and Hearing Children," *American Annals of the Deaf*, 115 (1970), 682-689.

The cloze procedure was used to examine the ability of deaf students to use context in reading. Three levels of context were used: connected discourse, individual sentences, and sentence fragments. Both deaf and hearing students responded similarly to the level of context available, although the overall accuracy for deaf students was much lower.

3.47 **Odom, P.B., and R.L. Blanton.** "Phrase-Learning in Deaf and Hearing Subjects," *Journal of Speech and Hearing Research*, 10 (1967), 600-605.

Deaf and hearing students were compared in their ability to learn a list of 4-word phrase fragments. Hearing students learned these fragments better when they formed a recognizable linguistic unit ("Paid the tall lady") than when the fragments were linguistically anomalous ("Lady tall the paid"). No such facilitation was found for the deaf, suggesting that deaf students do not process English in the same manner as do hearing students.

3.48 **Odom, P.B., and R.L. Blanton.** "Implicit and Explicit Grammatical Factors and Reading Achievement in the Deaf," *Journal of Reading Behavior*, 2 (1970), 47-55.

The reading comprehension of deaf and hearing students was compared using three types of reading passages: standard English, words written with a sign language syntax, and words written in an anomalous grammar. Deaf students show higher reading comprehension when passages are written using the grammar of their sign language.

3.49 **Odom, P.B., R.L. Blanton, and J.C. Nunnally.** "Some Cloze Technique Studies of Language Capability in the Deaf," *Journal of Speech and Hearing Research*, 10 (1967), 816-827.

A multiple-choice sentence completion task and several cloze passages were administered to groups of hearing and deaf students. The hearing subjects performed better on both tasks. The deaf students appeared to have greater difficulty restoring missing function words than words of other form classes. The authors conclude that the deaf use different types of rules in constructing a sentence than do hearing subjects.

3.50 **O'Neill, M.A.** "The Receptive Language Competence of Deaf Children in the Use of the Base Structure Rules of Transformational-Generative Grammar," doctoral dissertation, Univers-

ity of Pittsburgh, 1973. *Dissertation Abstracts International*, 34 (1973), 1154A. University Microfilms No. 73-21,220.

94 deaf students reading at a grade level of 3.3 were compared to 30 hearing students of comparable reading ability. The task was to read pairs of sentences and select the one that was grammatically correct. Despite being matched in overall reading ability, the deaf students scored lower in this task. The sequence of relative difficulty of various linguistic transformations was the same for both groups.

3.51 **Quigley, S.P.** "Effects of Hearing Impairment on Reading Development," in H. Reynolds (Ed.), *Gallaudet College Conference on Reading in Relation to Deafness*. Washington: Gallaudet College Press (in preparation).

Reviews the research showing that deaf students, even when matched in reading ability to hearing students, show significantly lower linguistic skills as demonstrated both by the cloze procedure and from writing samples. The author describes the development of the Test of Syntactic Abilities, built to measure the syntactic skills of students using only a first grade level vocabulary. The educational implications of the language defects observed are discussed in detail.

3.52 **Quigley, S.P., D.J. Power, and M.W. Steinkamp.** "The Language Structure of Deaf Children," *Volta Review*, 79 (1977), 73-83.

Presents the results of a study of syntactic structures in the language of deaf students aged 10-18. The responses of 450 deaf students to 22 tests of their knowledge of specific linguistic structures were examined. The occurrence of these structures in a typical basal reader series was also tabulated. Little correspondence was found between the deaf students' acquisition of linguistic forms and their appearance in typical basal readers.

3.53 **Quigley, S.P., et al.** *Syntactic Structures in the Language of Deaf Children*. Urbana: University of Illinois, 1976. Eric Document Reproduction Service No. ED 119 447.

Presents the results of administering the Test of Syntactic Abilities to 450 deaf students and 60 hearing students. Deaf students score substantially lower than hearing students on this test, but both groups show similar patterns in the development of syntactic skills. Detailed analysis of student performance in each area is provided.

3.54 **Woodward, H.M.E.** "A Nonsense Test of Structural Meaning," *Journal of Verbal Learning and Verbal Behavior*, 7 (1968), 31-32.

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Describes the development of a nonsense test to examine the deaf student's ability to extract meaning from structural cues in the sentence. The author's goal is to develop independent tests of the vocabulary and linguistic components to reading. The nonsense test was found to be highly correlated to Paragraph Meaning test scores in the Stanford Achievement Test.

Writing and Spelling Skills

The following papers analyze the written English of deaf students. Writing provides the opportunity to examine the English production skills independent from the phonemic articulation problems most of the students possess.

3.55 **Charrow, V.R.** *Deaf English: An Investigation of the Written English Competence of Deaf Adolescents, Technical Report No. 236.* Stanford, California: Stanford University, 1974. Eric Document Reproduction Service No. ED 105 668.

The author supports the view of "deaf English" as a nonstandard dialect of English. Examples of common "deafisms" are presented and compared with those of other dialects within English. The abilities of deaf and hearing students to read and recall information written in either standard English or deaf English are compared. Rewriting sentences into deaf English did not improve student performance.

3.56 **Hoemann, H.W., et al.** "The Spelling Proficiency of Deaf Children," *American Annals of the Deaf*, 121 (1976), 489-493.

The administration of a written spelling test showed that deaf students spell as well or better than hearing subjects. Deaf students make fewer spelling errors which are phonetically equivalent to the correct word than do hearing subjects. This precosity in spelling suggests that the linguistic deficiency traditionally ascribed to deaf children ought to be attributed to their linguistic environment, since these children are able to acquire spontaneously rules that are accessible to them.

3.57 **Lake, D.** "Syntax and Sequential Memory in Hearing Impaired Children," in H. Reynolds (Ed.), *Gallaudet College Conference on Reading in Relation to Deafness.* Washington: Gallaudet College Press (in preparation).

The English language is one where the sequential order of words is critical for its understanding. One difference between deaf students with good and those with poor English skills may be attributed to the tendency to attend to the sequential order of stimuli. Children's awareness of temporal order was tested using an ambiguous digits test. Writing samples from each student showed that those who did not attend to sequential order also had deficient writing skills.

3.58 **Levitt, H., and W. Newcomb.** "Computer-Assisted Analysis of Written Language: Assessing the Written Language of Deaf Children," *Journal of Communication Disorders*, 11 (1978), 257-277.

Reviews the various methods to assess the written language of deaf students. The authors describe a computer-based system capable of analyzing the syntactic structures found in the writing of deaf students.

3.59 **Wilbur, R.B., and S.P. Quigley.** "Syntactic Structures in the Written Language of Deaf Children," *Volta Review*, 77 (1975), 194-203.

The writing skills of 450 deaf students were examined over a five-year period. The authors describe in detail the systematic syntactic patterns underlying the writing errors of these students.

3.60 **Woodward, H.M.E.** "Measuring Language Growth in Older Deaf Children: A Classified Bibliography (August 1974)," *Volta Review*, 77 (1975), 241-242.

Summarized 25 papers published from 1936 to 1974 which presented various methods of assessing the writing of deaf students.

Communication Mode Research

Clearly, the reading skills of deaf students are deficient when compared to those of hearing students. These studies attempt to move beyond this observation and examine the relative efficiency of reading in comparison to other communication modes. What system represents the most effective medium for giving information to deaf students?

The most remarkable finding here is the way that reading is superior to either speechreading or signing for most deaf students. Despite the deficiency in reading achievement, reading remains the best medium for learning factual information.

3.61 **Stuckless, E.R.** "Manual and Graphic Communication," *Volta Review*, 78 (1976), 96-101, 147-148.

Reviews recent research examining the effects of early manual communication training. Also examines recent research on the development of reading and writing skills of deaf students with emphasis on the use of these skills for communication among deaf adults.

3.62 **Stuckless, E.R., and G. Pollard.** "Processing of Fingerspelling and Print by Deaf Students," *American Annals of the Deaf*, 122 (1977), 475-479.

The relative efficiency of print and fingerspelling was compared

using 19 deaf high school students. The students correctly identified 50 percent of the words fingerspelled and 64 percent of the printed words, suggesting that reading is a more effective communication medium. Proficiency in reading and fingerspelling were found to be highly correlated (r = 0.87).

3.63 **Weiss, K.L., M.W. Goodwin, and D.F. Moores.** *Characteristics of Young Deaf Children and Early Intervention Programs, Research Report 91.* Minneapolis: University of Minnesota, 1975. Eric Document Reproduction Service No. ED 116 426.

Presents the results of a four-year study of seven early intervention programs for deaf children. Most started with an oral emphasis but shifted to Total Communication approaches during the study. This report examines student growth in communication through reading, speech, and sign, as well as the growth of other psycholinguistic skills.

3.64 **White, A.H., and V.M. Stevenson.** "The Effects of Total Communication, Manual Communication, Oral Communication, and Reading on the Learning of Factual Information in Residential School Deaf Children," *American Annals of the Deaf*, 120 (1975), 48-57.

Deaf students aged 11 to 18 were tested on ability to assimilate information through reading, Total Communication, manual communication, and oral communication. Students gained more information through reading than any other method. Manual communication and Total Communication were superior to oral communication.

Part 4 INSTRUCTIONAL APPROACHES

The final section summarizes the current literature on approaches to develop the reading skills of deaf students. Included herein are papers on major programs and their underlying philosophies, as well as accounts of specific classroom techniques.

Many of the programs, materials, and techniques described in this section are adapted from those used for hearing children. As one examines these, particular attention should be given to their appropriateness for deaf learners and the adaptations needed to make them more effective.

Major Programs and General Issues

This first series of papers emphasizes the major issues within instructional programs for the deaf, rather than describing particular materials or techniques. Many of these papers are descriptions of programs in use at a particular institution for the deaf.

One major weakness of this literature has been the frequent lack of data presented to validate the effectiveness of approaches advocated. Often, where the program of a particular school is described, it would seem easy to present information about the reading achievement of these students.

4.01 **Anderson, N.O., and R.D. Laird.** "Teaching the Deaf Child to Read," *Audiovisual Instruction*, 17 (1972), 19-20.

Presents the rationale behind the reading program used at the Wyoming School for the Deaf. This program uses carefully coordinated presentations of movies, slides, and other media to augment its reading and language programs. The goal is to bypass any language deficits through rich visual experiences.

4.02 **Blackwell, P.M., et al.** *Sentences and other Systems: A Language and Learning Curriculum for Hearing Impaired Children*. Washington: Alexander Graham Bell Association for the Deaf, 1978.

Presents a comprehensive language, reading, and writing program for hearing impaired students from preschool to high school levels.

The curriculum is heavily based on recent research on transformational linguistics and research on reading models.

4.03 **Clark, C.R., and R.W. Woodcock.** "Graphic Systems of Communication," in L.L. Lloyd (Ed.), *Communication Assessment and Intervention Strategies*. Baltimore: University Park Press, 1976.

Reviews the research on teaching reading to children with severe language and communication handicaps. The authors evaluate nonalphabetic writing systems such as rebus writing as well as conventional methods.

4.04 **Crandall, K.F.** "Reading and Writing Skills and the Deaf Adolescent," *Volta Review*, 80 (1978), 319-332.

Reviews the research on the problems faced by deaf students in learning to read and write English. Techniques for assessing the written language skills are presented and the language development program of the National Technical Institute for the Deaf (NTID) is described.

4.05 **Duffy, J.K.** "i/t/a and the Hearing Impaired Child," *Volta Review*, 68 (1966), 150-153.

Reviews the feasibility of using the initial teaching alphabet (i.t.a.) with deaf children. The author advocates the early use of i.t.a. coupled with hearing aids and speech training as a means for developing language skills.

4.06 **Geoffrion, L.D.** "Reading without Sound: An Instructional Model for Teaching Reading to Non-oral Deaf Children," in H. Reynolds (Ed.), *Gallaudet College Conference on Reading in Relation to Deafness*. Washington: Gallaudet College Press (in preparation).

Reviews the research on how deaf students who communicate primarily through sign languages read, with emphasis given to instructional implications. Since the non-oral deaf student appears to code information through a manual sign code, instruction in word identification should focus on developing symbol-sign relationships instead of symbol-sound relationships. Further attention also must be given to the linguistic differences between ASL and English.

4.07 **Gormley, K.A., and A.M. Franzen.** "Why Can't the Deaf Read? Comments on Asking the Wrong Question," *American Annals of the Deaf*, 123 (1978), 542-547.

A review of current research on the deaf reader indicates these readers are usually viewed from a deficiency model. The authors recommend viewing the reader as one who reads differently rather than deficiently. Too much instructional emphasis has been placed

on the syntactic surface structure of English without adequate concern over the deaf reader's use of semantic or meaning factors. The authors argue that the deaf reader recreates meaning at the semantic level in terms of prior knowledge and experiences.

4.08 **Hart, B.O.** *Teaching Reading to Deaf Children.* Washington: Alexander Graham Bell Association for the Deaf, 1963.

Presents the reading program in use at the Lexington School for the Deaf. Many examples of specific teaching activities are provided. No data on the effectiveness of this program are presented.

4.09 **Henderson, J.M.** "Learning to Read: A Case Study of a Deaf Child," *American Annals of the Deaf,* 121 (1976), 502-506.

This study reports the approach used by the parents of a deaf boy to teach him to read. The approach is based on a progression: from *meaning* to *sight vocabulary* to *reading books.* The importance of communication and interaction within the context of an intimate relationship are pointed out. The boy's test results showed a third grade reading ability at age six.

4.10 **Magner, M.J.** "Reading: Goals and Achievements at Clarke School for the Deaf," *Volta Review,* 66 (1964), 464-468.

Presents the instructional goals in reading for the Clarke School and the assessment tools used to monitor student achievement. No data on program effectiveness are provided.

4.11 **McCarr, D. "Individualized Reading for Junior and Senior High School Students,"** ***American Annuals for the Deaf,*** **118 (1973), 488-495.**

Describes an individualized reading program organized for 68 deaf teenagers. Students participating in this program improve their reading skills by 1.3 grade levels, compared to a 0.3 to 0.5 year growth in prior years. An annotated bibliography of useful reading materials is also provided.

4.12 **Naiman, D.** "A Different Emphasis in Reading for Deaf Children," *Volta Review,* 67 (1965), 632-634.

Reading is a pathway to an understanding of life. A reading program that does not include words expressing emotions lacks a realistic approach. Deaf students need greater opportunities to read about and express emotional concerns.

4.13 **Rudloff, J.S.** "The Hearing Handicapped Retarded Reader," *Volta Review,* 68 (1966), 150-153.

While a child's hearing loss will make reading instruction more difficult, it may not always be the only reason for reading retardation. Factors which may also contribute to the poor reading achievement of the hearing handicapped child include personality,

home situation, early reading experiences, school environment, intelligence, physical factors, mental health, and experiential background, as well as interest and purpose in reading. The teacher must devise a reading program to overcome these difficulties.

4.14 **Shepard, C.H.** "Teaching Language to Mentally Retarded Deaf Children: A Review of the Literature and a Description of One Classroom Program," *American Annals of the Deaf*, 121 (1976), 366-369.

A special language program for multihandicapped deaf students was developed. The program's major components emphasize the learning of emergency words, practical experience vocabulary, and highly structured activities for concept development, using individualized instruction throughout. Particular attention is also given to developing writing skills through drill work.

4.15 **Simmon, A.A.** "Content Subjects through Language," *Volta Review*, 70 (1968), 487-492.

Language and curriculum are closely interrelated, making it impossible to teach one without the other. Vocabulary, syntax, and speech patterns should be drawn from content subjects and presented through first hand experiences.

4.16 **Streng, A.H.** "The Language Arts in the Curriculum for Deaf Children," *Volta Review*, 70 (1968), 487-492.

Language development must be considered an integral part of the total school plan. The subject matter fields can contribute not only to vocabulary growth but can also provide opportunity for growth in spoken, written, and reading language. The integrated learning unit may be the best method to organize learning experiences for the deaf.

4.17 **Withrow, F.B.** "Acquisition of Language by Deaf Children with other Disabilities," *Volta Review*, 68 (1966), 106-115.

Reviews the current research on educating multihandicapped deaf students. Included are discussion of approaches for deafness, complicated by learning disability, cerebral palsy, emotional disturbance, mental retardation, and blindness.

4.18 **Withrow, M.S.** "The Augmented Roman Alphabet—Can it Be Used for Teaching the Deaf?" *Volta Review*, 66 (1964), 540-543.

Discusses the feasibility of using the initial teaching alphabet (i.t.a.) with deaf students. Two problems must be resolved before using this system. One is the lack of adequate materials printed in i.t.a., and the other is the limited vocabulary of deaf children.

Technological Approaches to Reading

Educators of the deaf have long been interested in whether technological aids might make instruction in reading and language more effective. The following papers describe a variety of such approaches including programed instruction, multimedia presentations, computer assisted instruction, and others.

4.19 **Caldwell, D.C.** "Use of Graded Captions with Instructional Television for Deaf Learners," *American Annals of the Deaf*, 118 (1973), 500-507.

Captioned videotapes were prepared for two science modules in a school for the deaf. Two classes used the modules, one using captions of easy readability for that class's reading skills, while the other class used captioned films of harder readability for that group. The group reading harder captions gained as much from the science lessons as the group reading easier captions, but also improved more in measures of language skills. The author argues that deaf students can read more difficult materials than indicated by test scores and that student exposure to those materials helps to foster language growth.

4.20 **Cline, C.J.** "Teaching Deaf Children to Read and Write through Programmed Instruction," *Teacher of the Deaf*, 72 (1974), 91-98.

Attention is drawn to the linguistic retardation of children with impaired hearing, and programed learning is proposed as a remedial measure. The process is described, the advantages are listed, and the results of research are reported. Some disadvantages are discussed and special problems are dealt with, such as the use of teaching machines.

4.21 **Culbertson, L.B.** "CAI—Beneficial Teaching Tool at Texas School for the Deaf," *American Annals of the Deaf*, 119 (1974), 34-40.

Describes the use with deaf students of the Stanford Computer-Assisted Instruction (CAI) program in mathematics and language arts. The curriculum includes use of computer based programed instruction to develop basic English skills.

4.22 **Fletcher, J.D., and C.M. Stauffer.** "Learning Language by Computer," *Volta Review*, 75 (1973), 302-311.

Describes the Stanford Computer-Assisted Instruction (CAI) program in language arts for deaf students. The major objectives of the curriculum are that students should: 1) recognize specified

grammatical transformations, 2) recognize and supply various forms of given grammatical structures, 3) select appropriate grammatical units to complete a specified grammatical structure, and 4) perform specified transformations on given grammatical structures. Programed reading is the major mode of instruction.

4.23 **Fricke, J.E.** *CAI in a School for the Deaf: Expected Results and a Serendipity or Two.* Scranton, Pennsylvania: Scranton State School for the Deaf, 1976. Eric Document Reproduction Service No. ED 129 270.

Describes the use of the Stanford CAI system to develop math and reading skills. Students in the middle school improved 0.4 grade levels in reading while deaf high schoolers increased 1.1 years after the first year of system use. Teacher reactions to this system were very favorable.

4.24 **Geoffrion, L.D., and R.D. Bergeron.** *Initial Reading through Computer Animation.* Durham: University of New Hampshire, 1976. Eric Document Reproduction Service No. ED 138 929.

Describes the Computer Animated Reading Instruction System (CARIS), a computer-based initial reading system for handicapped children. In this program children can explore the meanings of various sentences formed by watching computer animated cartoons based on those sentences. The case study of one auditory handicapped student using the system is presented.

4.25 **Goldenberg, E.P.** *Special Technology for Special Children: Computers as Prostheses to Serve Communication and Autonomy in the Education of Handicapped Children.* Baltimore, Maryland: University Park Press, 1979.

Describes using the computer to enable handicapped students to explore their environment in ways previously unavailable to them. Through activities such as teaching the computer to solve mazes, draw pictures, and generate sentences, deaf children can develop cognitive and linguistic skills. Unlike teaching machines or traditional computer-assisted instruction, these activities emphasize exploratory learning instead of drill.

4.26 **Laird, R.** "The Wyoming Picture '74: Development and Use of a Coordinated Media System in a Small Public School," *American Annals of the Deaf*, 119 (1974), 488-499.

Presents examples of the coordinated use of various media materials to develop reading and language skills. Reading assignments are carefully reinforced through movies, slides, and transparencies. Students at the school markedly increased their reading and other language skills through this program.

4.27 **Madachy, J.L., and J.D. Miller** *The Use of CAI in the Language Program at Gallaudet.* Washington, D.C.: Gallaudet College, 1976. Eric Document Reproduction Service No. ED 119 625.

Employing an English-as-a-second-language approach, Gallaudet College has developed 101 computer assisted instruction (CAI) lessons to help deaf students master basic English structures. These lessons begin with a pretest and then branch to appropriate explanations and drills. Some are accompanied by coordinated presentations in sign language. In the future, CAI lessons will be introduced into the regular curriculum with emphasis on language skills, reading, and remediation.

4.28 **Moore, O.K.** "The Responsive Environments Project and the Deaf," *American Annals of the Deaf*, 110 (1965), 604-616.

Reviews the research on using the talking typewriter with exceptional children and considers its feasibility for deaf students. The author advocates learning experiences which draw from and develop further the child's rich visual experiences rather than focusing on deficient auditory skills.

4.29 **Moore, O.K.** "The Inclusion of the Deaf within Communication Networks," *American Annals of the Deaf*, 119 (1974), 597-601.

Discusses the feasibility of using the "talking typewriter" with deaf students. The author advocates the development of communication aids, such as the videotelephone and interactive cable TV systems, as means to foster communication and language growth among deaf individuals.

4.30 **Morgan, J.M.** *Computer-Assisted Instruction for the Blind and Deaf.* Cincinnati, Ohio: Cincinnati Public Schools, 1975. Eric Document Reproduction Service No. ED 107 039.

A CAI system was developed to improve the reading and mathematics skills of about 400 deaf and blind students. While the components for the blind were not implemented, the deaf students used the system for one year. Teachers found the system satisfactory and believed it helped their students.

4.31 **National Educational Association.** *Project LIFE—Language Improvement to Facilitate Education: A Multimedia Instructional System for the Deaf Child.* Washington, 1972. Eric Document Reproduction Service No. ED 073 609.

Describes the development and philosophy underlying the language/reading program of Project LIFE. Sample lessons are shown and the evaluation of the program is discussed, but no data are presented.

4.32 **Pfau, G.S.** "Project LIFE PI Analysis," *American Annals of Deaf*, 114 (1969), 829-837.

Describes the development and curriculum goals of Project LIFE (Language Improvement to Facilitate Education of hearing impaired children). Project LIFE used filmstrips in a teaching machine to develop perceptual and language skills.

4.33 **Pfau, G.S.** "Project LIFE a Decade Later: Some Reflections and Projections," *American Annals of the Deaf*, 119 (1974), 549-553.

Describes the development and current form of Project LIFE. This project uses colored filmstrips in a programed instruction format to develop perceptual reading, language, and thinking skills.

4.34 **Pfau, G.S.** *Project LIFE, 1963-1975. Final Report.* Washington: National Foundation for the Improvement of Education, 1975. Eric Document Reproduction Service No. ED 117 878.

Describes the philosophy underlying Project LIFE, its development, and current form. This project uses colored filmstrips within a programed instruction format to develop initial reading and language skills. A bibliography of evaluation studies (mostly unpublished) is provided.

4.35 **Rubinstein, R., and E.P. Goldenberg** "Using a Computer Message System for Promoting Reading and Writing in a School for the Deaf," *Proceedings of the Seventh Annual Conference on Systems and Devices for the Handicapped*, 1978.

A computer-mail system was installed at a school for the deaf as part of their CAI system. In computer-mail, students can compose and send and receive letters from friends and teachers through the computer terminals. In three months, 20 deaf children who supposedly hated to write, spontaneously generated over 600 letters. Examples of the letters and the growth of writing skills that followed are presented.

4.36 **Stepp, R.E. (Ed.).** "Developments in Communication Technology for the Hearing Impaired: Symposium on Research and Utilization of Educational Media for Teaching the Deaf," *American Annals of the Deaf*, 123 (1978), 621-788.

Contains 22 papers reporting on the use of media techniques to develop the reading and language skills of deaf children and adults. Particular emphasis is given to captioned television, films, and the use of computer-based instruction.

4.37 **Vockell, K., E.L. Vockell, and P. Mattick.** "Language for Mentally Retarded Deaf Children: Project LIFE," *Volta Review*, 75 (1973), 431-439.

Project LIFE is a programed instruction teaching machine developed especially for hearing impaired children to foster the acquisition of functional language skills. The perceptual training, thinking activities, and programed language units are described. Two groups of mildly retarded deaf students were tested to evaluate the effectiveness of the perceptual training and thinking activities units of Project LIFE. Those students who participated in Project LIFE improved their perceptual and thinking efficiency more than control subjects who did not participate in the project.

4.38 **Withrow, F.B.** "Applications of Technology to Communication," *Volta Review*, 78 (1976), 102-106, 148.

Reviews recent developments in the use of programed learning teaching machines, captioned media, and the use of multimedia language laboratories in deaf education and adult deaf communication.

Reading Materials for the Deaf

The following papers are bibliographies or critiques of reading materials available for deaf students. Most of the bibliographies focus on commercially available materials for hearing students which can be adapted for use with the deaf. Unfortunately few bibliographies provide explicit information on what adaptations may be necessary.

The critiques pose several important concerns in writing or selecting materials for the deaf. Most reading materials originally written for hearing students assume students have a varied vocabulary and good linguistic skills prior to entering school. Few consider the experiential deficit resulting from the inadequate language skills of the deaf.

This section includes only professional papers about various materials. No advertising sources or promotional literature are included herein.

4.39 **(Anonymous)** *Instructional Materials Appropriate for Use in Deaf Education.* Los Angeles: University of Southern California, 1973. Eric Document Reproduction Service No. ED 085 929.

Contains an annotated bibliography of about 125 reading series or programs suggested for the deaf.

4.40 **Buchanan, C.** "Results of a Survey on the Use of Achievement Tests in Educational Programs for Hearing Impaired Students: United States, 1972-1973," *Further Studies in Achievement Testing, Hearing Impaired Student, United States: Spring 1971.* Washington: Gallaudet College, Office of Demographic Studies, Report Series D, Number 13, 1973.

864 special education programs were surveyed to determine their use of achievement tests with deaf students. The Stanford

Achievement Test, either alone or in combination with other tests, is used in 57 percent of the programs. Other tests used include the Wide Range Achievement Test (6 percent) and the Metropolitan Achievement Test (5 percent).

4.41 **Gates, E.** *The Dictionary as a Guide to Word Usage*. Terre Haute: Indiana State University, 1977. Eric Document Reproduction Service No. ED 143 007.

Describes *The Dictionary of Idioms for the Deaf* (published by The American School for the Deaf, Hartford, Connecticut). This dictionary helps deaf learners to understand common idioms by providing additional information about each idiom. In addition to defining each idiom, the dictionary gives information on grammatical and semantic constraints; describes its use in various dialects and social settings; and offers suggested aesthetic constraints in using each idiom.

4.42 **Grant, W.D.** "The Brill Educational Achievement Test: A Review," *American Annals of the Deaf*, 123 (1978), 522-523.

Reviews the BRAT, an achievement test specifically constructed for prelingually deaf students. Typographical errors in student test booklets, inadequate item selection, and inadequate statistical analysis detract from the test's value as an assessment tool.

4.43 **Hargis, C.H.** "The Relationship of Available Instructional Reading Materials to Deficiency in Reading Achievement," *American Annals of the Deaf*, 115 (1970), 27-29.

Reading materials designed for hearing students are not appropriate for deaf students. Particular problems include the use of too complex syntactic structures, idioms, and figurative speech. The author advocates the creation of reading materials specifically designed for deaf students.

4.44 **Hargis, C.H., C.C. Evans, and C. Masters.** "A Criticism of the Direct Discourse Form in Primary Level Basal Readers," *Volta Review*, 77 (1973), 557-563.

An experimental assessment of the relative readability of first grade level stories containing direct discourse and those without direct discourse showed that hearing impaired children have greater difficulty with direct discourse material. Various language formats, one being the use of balloons similar to comic strips, are suggested as alternatives to direct discourse for beginning reading materials.

4.45 **Lake County Public Library.** *Services for the Deaf: Check this Out*. Merryville, Indiana: 1976. Eric Document Reproduction Service No. ED 125 600.

A bibliography of reading materials for and about the deaf. Included are novels containing characters who are deaf, books about the development of deaf children, biographies of famous deaf adults, suggested books for deaf children and adults, and other resources.

4.46 **Lanfrey, J.L.** "Instructional Reading Materials for Deaf Children: Opinions and Beliefs of Educators of the Deaf," doctoral dissertation, University of Georgia, 1975. *Dissertation Abstracts International*, 36 (1975), 5597A. University Microfilms No. 76-6, 417.

Surveyed 192 educators of the deaf about their preferred teaching practices. Most favor a meaning emphasis approach to reading, emphasizing whole words over individual letters. 74 percent of the teachers prefer silent to oral reading, and 76 percent prefer relating a new word to its sign rather than to its speech form. Opinions about several other aspects of reading instruction were also polled.

4.47 **LaSasso, C.** "National Survey of Materials and Procedures Used to Teach Reading to Hearing Impaired Children," *American Annals of the Deaf*, 123 (1978), 22-30.

Questionnaire responses from 507 programs for hearing impaired children were examined to provide information on which instructional approaches are used most often, the strengths and weaknesses of various reading systems, and the procedures used to select materials for deaf students. The study shows a high demand for developing linguistically controlled materials that can be used effectively with profoundly deaf children.

4.48 **LaSasso, C.** "A Report of Preliminary Findings of an Investigation of the Validity and Reliability of the Cloze Procedure as a Measure of Readability and Comprehension for Prelingually, Profoundly Deaf Subjects," in H. Reynolds (Ed.), *Gallaudet College Conference on Reading in Relation to Deafness*. Washington: Gallaudet College Press (In preparation).

The cloze procedure is compared to the Stanford Achievement Test and a carefully constructed informal test of comprehension. The deaf students' scores on the cloze procedure failed to show a consistent pattern with readability measures and also were poorly correlated with the other comprehension measures. Deaf children appear to be more successful in answering directly phrased questions than incomplete sentences.

4.49 **McCarr, D. (Ed.).** *Teacher Recommended Materials for Use with Hearing Impaired Students*. Las Cruces, New Mexico: Southwest Regional Media Center for the Deaf, 1974. Eric Document Reproduction Service No. ED 143 195.

Contains a bibliography of teaching materials recommended by educators of the deaf in a survey of 167 schools. All materials are classified by grade level and subject area. The bibliography contains an estimated 1,000 citations.

4.50 **Peters, N., and J. Peters.** "Better Reading Materials for the Content Areas," *Volta Review*, 75 (1973), 375-387, 445-448, 509-513, 564-467.

Reviews the major concerns in selecting appropriate reading materials for deaf students. The use of informal reading inventories with deaf students is encouraged. Bibliographies are provided of recently available reading materials appropriate for deaf students in reading development, social studies, language, guidance, and consumer education. Most of the materials are adaptations of those used with hearing students.

4.51 **Rush, M.L.** "Writing for Children with Language and Reading Deficiencies," *Volta Review*, 74 (1972), 493-501.

Presents guidelines for writers to follow as they translate high-interest material into simple concise language which children with language handicaps can comprehend. The rationale and examples for each guideline are provided.

4.52 **Trboyevich, G., et al.** *A Bibliography: Easy Reading for Deaf Children.* Knoxville, Tennessee: Southern Regional Media Center for the Deaf, 1967. Eric Document Reproduction Service No. ED 029 425.

Contains an annotated bibliography of 312 easy reading selections for deaf students. All selections are intended for a grade span of K-6 and are designed to supplement reading programs.

Teaching Methods or Activities

This last section summarizes papers describing various teaching methods or activities used with deaf students.

Much current literature has emphasized language experience activities with deaf children. These activities encourage language and reading growth through exposing students to new experiences and then communicating about those experiences. Another major theme has been the attempt to expose deaf learners to more varied literature.

4.53 **Andrews, J., and A. Dexheimer.** "*Jaws* in the Classroom," *Teaching Exceptional Children*, 9 (1976), 24-25.

Describes the use of a popular film and book as the focus of a language arts program for deaf teenagers. Examples are provided of reading, math, art, science, social studies, and values clarification lessons keyed to this book.

4.54 **Anken, J.R., and D.W. Holmes.** "Use of Adapted 'Classics' in a Reading Program for Deaf Students," *American Annals of the Deaf*, 122 (1972), 8-14.

Eleven classics from the literature were adapted for use with deaf students. Results are discussed in terms of applicability and their effects on improvement in word and paragraph meaning. A comparison is made between classes using basal reading systems and a class using adapted classics.

4.55 **Bell, J.W.** "Visual Language," *Volta Review*, 73 (1971), 157-160.

Using a word for the central theme, deaf students create montages of pictures from magazines pertaining to and describing that word. Allowing the student to use visual media where vocabulary is limited provides an insight into the deaf person's concept of words and language. This process is suggested as an approach to language development and vocabulary enrichment for these students.

4.56 **Bornstein, H.** "The Design of Signed English Readers," in H. Reynolds (Ed.), *Gallaudet College Conference on Reading in Relation to Deafness*. Washington: Gallaudet College Press (in preparation).

Describes the development of the Signed English readers. These are brief readers in which drawings of people signing are used to supplement the reading of the text. Thus children can immediately see the sign equivalent of each word encountered.

4.57 **Buckler, M.S.** "Expanding Language through Patterning," *Volta Review*, 70 (1968), 89-96.

Describes the use of pattern drills as a means to improve the English language skills of deaf children. Pattern drills emphasize the substitution of words and clusters of words within a sentence to generate large groups of linguistically similar sentences.

4.58 **Dawson, E.H.** "An Experiment to Investigate the Optimal Use of Fingerspelling in a Teacher/Learning Classroom Situation," *Teacher of the Deaf*, 74 (1976), 402-411.

Compared four different methods of teaching students how to spell unfamiliar words. The approach emphasizing students' both reading and fingerspelling the word was more effective than methods involving reading or fingerspelling alone.

4.59 **Edwards, N.S.** "Puppets and the Nonverbal Child," *Volta Review*, 77 (1975), 512-514.

Provides examples of using puppet shows to develop preschool language and early reading skills.

4.60 **Kiely, A.** "Lend Me Your Ears . . . or at Least Draw Me a Picture," *Volta Review*, 77 (1975), 423-430.

Through the use of simple drawings and stories the parents of a deaf child helped him to develop speech and reading skills. Sample stories demonstrate how to help children remember special events, develop curiosity, anticipate changes, and learn proper social behavior. Practical suggestions in using a journal with children are also provided.

4.61 **Long, G., R. Hein, and D. Coggiola.** *Networking: A Semantic-Based Learning Strategy for Improving Prose Comprehension.* Rochester, New York: Department of Research and Development Paper Series, National Technical Institute for the Deaf, 1978.

Describes the development of networking, a learning strategy emphasizing the process of identifying and understanding the relationships among concepts in a prose passage. Training procedures were developed to communicate the networking system to deaf college students. Networking was found to have potential as an effective prose learning strategy.

4.62 **Maxwell, M.** "Teaching Reading as a Problem-Solving Activity," *American Annals of the Deaf*, 119 (1974), 721-723.

Too often, teachers limit their instruction in reading to word recognition skills and literal comprehension questions. The author stresses the need to guide students to formulate their own questions and answer them by reading. Reading must be seen as a problem-solving activity. The approach described is very similar to Stauffer's directed reading-thinking activity. A sample lesson is described.

4.63 **McDermott, E.F.** "Storytelling: A Relaxed and Natural Path to Lipreading, Language, and Reading," *Volta Review*, 73 (1971), 54-57.

Storytelling, emphasizing the enjoyable use of good children's literature, is encouraged as a home activity to develop the language and reading readiness skills of deaf students. A bibliography is provided of popular children's literature that parents might use with their children.

4.64 **Newby, R.** "Language and Reading: A Visual Structure," *American Annals of the Deaf*, 119 (1974), 572-577.

Describes the use of illustrations to introduce new vocabulary. Particularly interesting is its use for teaching abstract words and the reading of various sentence patterns.

4.65 **Olson, R.L.** "Screening and Teaching Irregular Verbs," *Volta Review*, 78 (1976), 341-344.

Presents a method to teach the correct recognition of irregular verbs through the use of flip cards to portray the meaning of the different verb tenses.

4.66 **Reed, R.D.** "The Language Story Method," *American Annals of the Deaf*, 122 (1977), 482-488.

Presents an approach to language development built around the use of stories and lessons in language and reading centered on that story.

4.67 **Reynolds, J.A., and L.R. deReynolds.** "A Parent's Approach to Language: The Daily Journal," *Volta Review*, 74 (1972), 345-351.

Two parents describe their use of a daily journal, including pictures and brief stories, to foster language and reading development in their deaf child. The journal stories describe recent events, feelings, and ideas that are part of the child's everyday life. Because the language he learns is closely related to his own interests, it becomes an expression not only of his wants and needs, but also of his individual personality.

4.68 **Stafford, C.** "Reading for Deaf Children," *American Annals of the Deaf*, 111 (1966), 463-466.

Describes the use of uninterrupted group oral reading with deaf students. Students must read aloud from whatever material they wish for a five-minute period. Oral reading was used to permit teacher monitoring. Since the students are deaf they are not distracted by the oral reading of others. During the year, as interests and skills improved, the reading period lengthened.

4.69 **Stark, B.** "A Look at Comic Books at Illinois School for the Deaf," *American Annals of the Deaf*, 121 (1976), 470-477.

Describes the use of comic books as high interest reading materials for deaf students. The availability of comics did not decrease book circulation. Some examples of instructional uses of comics are also provided.

4.70 **Wallace, E.** "Polaroid Camera Used in Teaching Language," *Volta Review*, 73 (1971), 353-355.

Describes using a Polaroid camera to bring home and community experiences into the classroom. These pictures are used for vocabulary development and for generating experience stories.

4.71 **Wood, M.W.** "Teaching Reading to Deaf Children: A Study in Education," doctoral dissertation, University of Pennsylvania, 1973. *Dissertation Abstracts International*, 34 (1974), 4940A. University Microfilms No. 74-1, 368.

This thesis is the continuation of one started in 1948 and, hence, it

provides an interesting insight into past opinions and practices. The study itself examined the effectiveness of using tachistoscopes in the reading program of deaf students. The results were mixed. After training, intermediate students improved in word identification but not comprehension. The opposite took place for advanced reading students.

4.72 **Ziff, L.** "Utilization of Visually-Oriented Media to Motivate Language Facility in Hearing Impaired Children," *Volta Review*, 76 (1974), 178-181.

Interest and skills in writing were developed through using Polaroid cameras and typewriters. After learning touch typing, deaf students take pictures with the cameras and then compose their own stories based on the pictures.

APPENDIX

Note for Future Researchers

Sources

This annotated bibliography is designed to be as complete a collection as possible of the published literature on deafness and reading. In selecting articles for presentation the following sources were searched:

Abstracts

Eric, Resources in Education
Exceptional Child Education Abstracts
Deafness, Speech, and Hearing Abstracts
Dissertation Abstracts International

Wherever possible the annotations are based on the original articles rather than derived abstracts to assure accuracy and relevance. The reference citations of papers were often consulted to check for articles missed from the above abstracts.

Journals

American Annals of the Deaf and *Volta Review* were skimmed to search for additional articles. These two journals were checked because the abstract anthologies indicated they would be the most probable sources of relevant articles, and because these two are the most widely read journals in deaf education.

Current Contents

Current Contents has been regularly scanned since 1976 to detect relevant articles published in lesser known journals.

Selection Criteria

In selecting articles for this bibliography, all articles meeting the following criteria were included:

1. The article was published since 1967, or, if older, is of continued current interest.
2. The articles are publicly published in a form readily available to most educators or researchers.
3. The articles are primarily professional in content rather than newspaper stories or advertisements.

The only major sections of this bibliography which are clearly incomplete are the background issues (Part 1) and the section on comprehension and language development (Part 3F). Part I was intended solely as an introduction for the reader who may have had no experience with deafness. The language development section is incomplete since this area is the major focus of most research on deafness and this topic alone could easily produce a bibliography far larger than this one. The articles included are ones the editors felt were particularly relevant to the reading growth of deaf children.

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